Parts

INSTRUCTIONS-PARTS LIST

308496

Rev. F

This manual contains important warnings and information.
READ AND KEEP FOR REFERENCE.

INSTRUCTIONS

AUTOMATIC, 60 kV, ELECTROSTATIC,

Model PRO 5500wb™ Air Spray Gun

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure

For use when electrostatically spraying conductive, waterborne fluids that meet at least one of the following conditions for non-flammability:

1. The fluid has a flash point above 140°F (60°C) and a maximum organic solvent concentration of 20%, by weight, per ASTM Standard D93.

2. The fluid does not sustain burning when tested per ASTM Standard D4206 Sustained Burn Test.

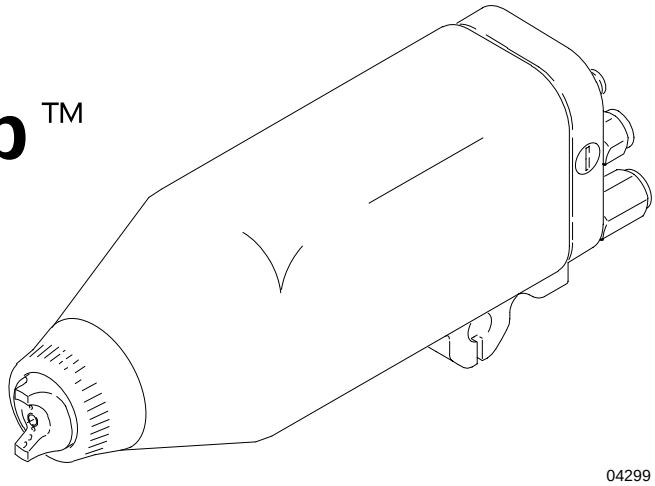
Part No. 237603*, Series A
Includes the spray gun, shroud, manifold, and mounting bracket.

Part No. 236824, Series A
Includes the spray gun and shroud only.

Part No. 238091, Series A
Includes the spray gun, shroud, manifold, regulator, and mounting bracket.

NOTE: The fluid hose must be ordered separately.

U.S. PATENT NO. 4,290,091; 4,219,865; 4,497,447; 4,462,061; 4,660,774; 5,063,350; 5,073,709; 5,080,289; 5,093,625; 5,289,977
Patented 1986, 1987 Canada
Brevete 1986, 1987
U.K. PATENT NO. 2,147,158; 2,142,559B; 2,140,327–B
Other U.S. and Foreign Patents Pending



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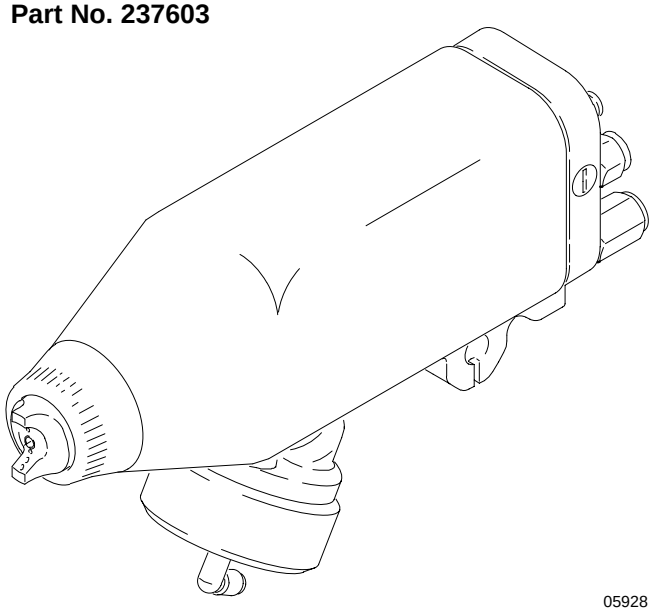
Part No. 237603



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Part No. 238091

Factory Mutual System Approved

NOTE: The PRO 5500wb spray gun is Factory Mutual approved for use with Graco isolation systems. The spray gun is also approved for use with other Factory Mutual approved voltage isolations systems provided that the fluid hose is assembled as shown in Fig. 15, page 17. Any modification of genuine Graco parts or replacement of parts with non-Graco parts will void agency approvals.

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440–1441

Table of Contents

Symbols

Warning Symbol

⚠ WARNING

This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol

⚠ CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the corresponding instructions.

⚠ WARNING

ELECTRIC SHOCK HAZARD

Improper grounding or an improper setup and usage of an isolated waterborne system can cause a hazardous condition and result in an electric shock or other serious injury.

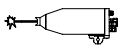
- Ground the equipment, personnel in or close to the spray area, the object being sprayed, and all other electrically conductive objects in the spray area. See **Ground the System** on page 17.
- The gun must be connected to a voltage isolation system that will discharge the system voltage when the gun is not in use.
- All components of the isolation system that are charged to high voltage must be contained within a fence or enclosure that prohibits personnel from making contact with the high voltage components before the system voltage is discharged.
- The gun turbine air supply must be interlocked with the isolation system to shut off the turbine air supply anytime the isolation system enclosure or safety fence is opened.
- The voltage isolation system must be interlocked with the spray area entrance to automatically discharge the voltage and ground the fluid whenever someone enters the spray area.
- The areas of the waterborne fluid hose that are accessible to the personnel must be covered by the conductive hose layer. The area on the hose that is not covered by the conductive hose layer must be inside the voltage isolation system enclosure. Refer to Fig. 15, page 17.
- Only use the red-colored Graco electrically conductive gun air hose with this gun. Do not use the black or grey-colored Graco air hoses.
- Install only one continuous Graco waterborne fluid hose between the isolated fluid supply and the spray gun. Do not splice hoses together.
- Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 when instructed to discharge the voltage; before cleaning, flushing, or servicing the system; before approaching the front of the gun or the gun-mounted fluid regulator; and before opening the safety fence or the enclosure for the isolated fluid supply.
- Do not use the Graco ES Display Module readings to determine if your system is discharged. The display modules will only display the system voltage while the gun power supply is operating. Follow the **Fluid Voltage Discharge and Grounding Procedure** to ensure the system is discharged.
- Do not enter a high voltage or hazardous area until all high voltage equipment has been discharged.
- Do not come within 2 ft. (610 mm) of the gun nozzle or gun-mounted fluid regulator during gun operation or until after following the **Fluid Voltage Discharge and Grounding Procedure**.
- If there is any static sparking while using the equipment, **stop spraying immediately**. Identify and correct the problem.
- Follow the warnings and instructions in the voltage isolation system manual.

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Improper grounding, poor air ventilation, open flames, or sparks can cause a hazardous condition and result in a fire or explosion.

- Electrostatic equipment must be used only by trained, qualified personnel who understand the requirements stated in this instruction manual.
- Ground the equipment, personnel in or close to the spray area, the object being sprayed, and all other electrically conductive objects in the spray area. See **Ground the System** on page 17.
- Test the gun electrical resistance daily as instructed on page 33.
- Provide fresh air ventilation to avoid the buildup of toxic vapors. Interlock the gun turbine air supply to prevent operation of the power supply unless the ventilating fans are on. See **Ventilate the Spray Booth** on page 9.
- Only use this equipment to spray non-flammable, waterborne fluids, as defined on the front cover of this manual.
- Only flush, purge, or clean the electrostatic, waterborne spray system with non-flammable fluids, as defined on the front cover of this manual.
- Do not flush the system with the gun electrostatics turned on.
- Use only non-sparking tools to clean residue from the booth and hangers.
- Extinguish all open flames or pilot lights in the spray area.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Do not store any flammable fluids in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not smoke in the spray area.
- Do not operate a gasoline engine in the spray area.



PRESSURIZED EQUIPMENT HAZARD

Spray from the gun, hose leaks, or ruptured components can splash fluid in the eyes or on the skin and cause a serious injury.

- Do not point the spray gun at anyone or any part of the body.
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** on page 19 whenever you: are instructed to relieve the pressure; stop spraying; clean, check, or servicing the equipment; and install or clean the fluid nozzles.
- Tighten all the fluid connections before each use.
- Check the hoses, tubes and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.

Warnings are continued on the next page.

⚠ WARNING

EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction, or start unexpectedly and result in a serious injury.

- This equipment is for professional use only.
- Read all the instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Do not operate the gun power supply above 60 kV. Use only the Graco power supply, part no. 237250, with this spray gun.
- Check the equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated system component. This equipment has a **100 psi (0.7 MPa, 7 bar) maximum working air and fluid pressure**.
- Use fluids that are compatible with the equipment wetted parts. See the **Technical Data** section of all the equipment manuals. Read the fluid manufacturer's warnings.
- Route the hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below –40°F (–40°C).
- Do not use the hoses to pull equipment.
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state, and national fire, electrical, and other safety regulations.

TOXIC FLUID HAZARD

Hazardous fluids or toxic fumes can cause a serious injury or death if splashed in the eyes or on the skin, swallowed, or inhaled.

- Know the specific hazards of the fluid you are using. Read the fluid manufacturer's warnings.
- Store hazardous fluid in an approved container. Dispose of the hazardous fluid according to all local, state, and national guidelines.
- Wear appropriate protective clothing, gloves, eyewear, and respirator.

Introduction

Spraying Waterborne Fluids Electrostatically

The PRO 5500wb spray gun is a 60 kV electrostatic spray gun that is designed to spray conductive, waterborne, non-flammable fluids. When spraying waterborne fluids electrostatically, the gun must be connected to a voltage isolation system, which isolates the fluid supply from ground and allows voltage to be maintained at the tip of the gun. For information on the Graco H^2O PRO Voltage Block System, contact your Graco distributor.

A safe, well designed voltage isolation system should have the following features:

- All components of the isolation system that are charged to high voltage must be contained within a fence or enclosure that prohibits personnel from making contact with the high voltage components before the system voltage is discharged.
- A means for automatically discharging the system voltage if someone opens the fence or enclosure or enters the spray area.
- A bleed resistor to drain off the system voltage when the spray gun is not in use.
- The system should not have any severe arcing occurring when the isolation mechanism opens and closes. Severe arcing will shorten the life of the system components.

⚠ CAUTION

The Graco warranty is void if the spray gun is connected to a non-Graco voltage isolation system or if the gun is operated above 60 kV.

When connected to a voltage isolation system, all of the fluid in the spray gun, fluid hose, and isolated fluid supply are charged to high voltage, which means that the system has more electrical energy than a solvent-based system. Therefore, only non-flammable fluids (defined on the front cover of this manual) can be sprayed with the system or be used to clean, flush, or purge the system.

Precautions must be taken when using electrostatic waterborne equipment to avoid potential shock hazards. When the spray gun charges the isolated fluid to high voltage, it is similar to charging a capacitor or battery. The system will store some of the energy while spraying and retain some of that energy after the spray gun is shut off. It is not safe to touch the front end of the gun until the stored energy is discharged. The amount of time it takes to discharge the energy depends on the system design. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 19, before approaching the front of the gun.

Operating the Spray Function

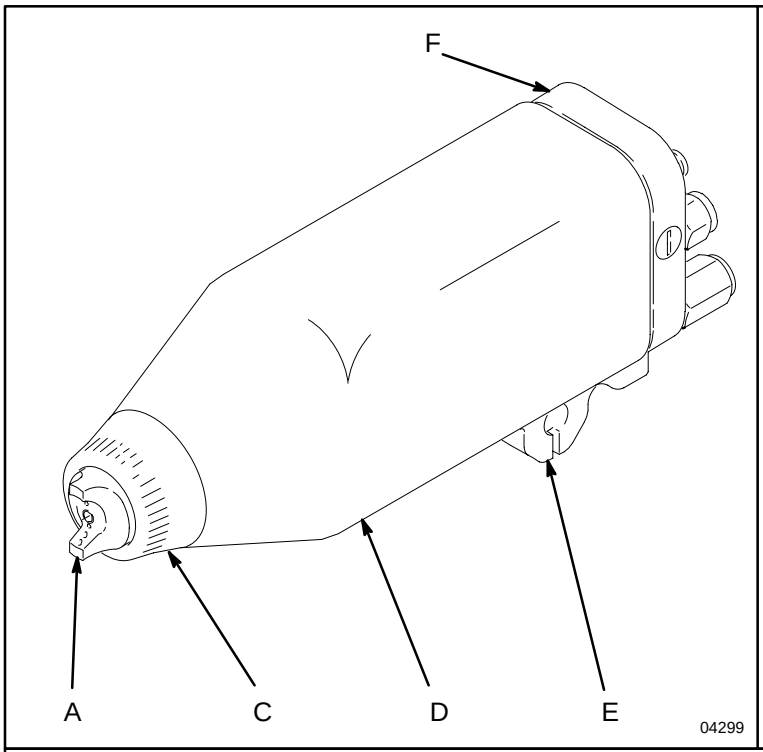
Applying a minimum of 50 psi (345 kPa, 3.5 bar) air pressure to the gun manifold's cylinder air fitting (which is marked "CYL", see page 7) will retract the gun piston, which opens the air valves and a short time later opens the fluid needle. This provides the proper air lead and lag when triggering the gun. A spring returns the piston when the cylinder air is shut off.

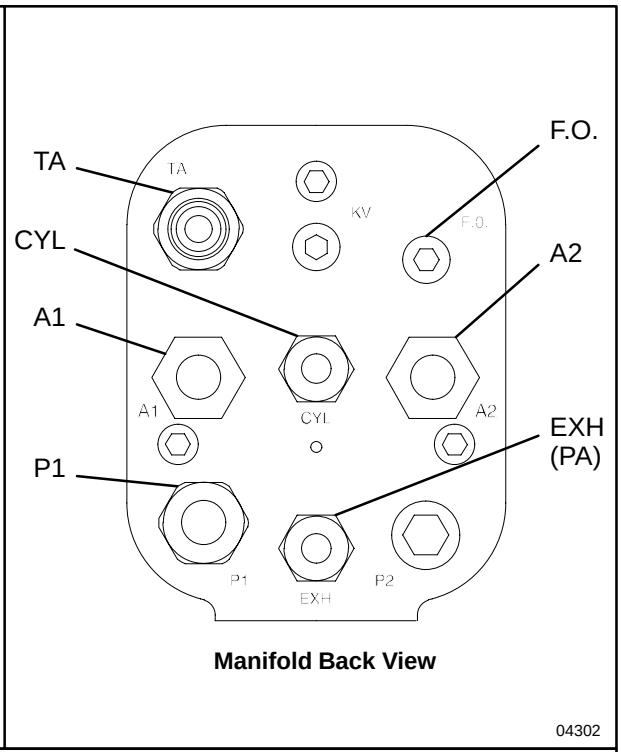
Operating the Electrostatics
(Refer to page 7)

To operate the electrostatics, air pressure is applied to the gun manifold's turbine air fitting (which is marked "TA") through a Graco electrically conductive air hose. The air enters the manifold and is directed to the inlet of the power supply turbine (G). The air spins the turbine, which then provides electrical power to the internal high voltage power supply (H). The fluid is charged by the spray gun electrode (J). The charged fluid is attracted to the nearest grounded object, wrapping around and evenly coating all surfaces.

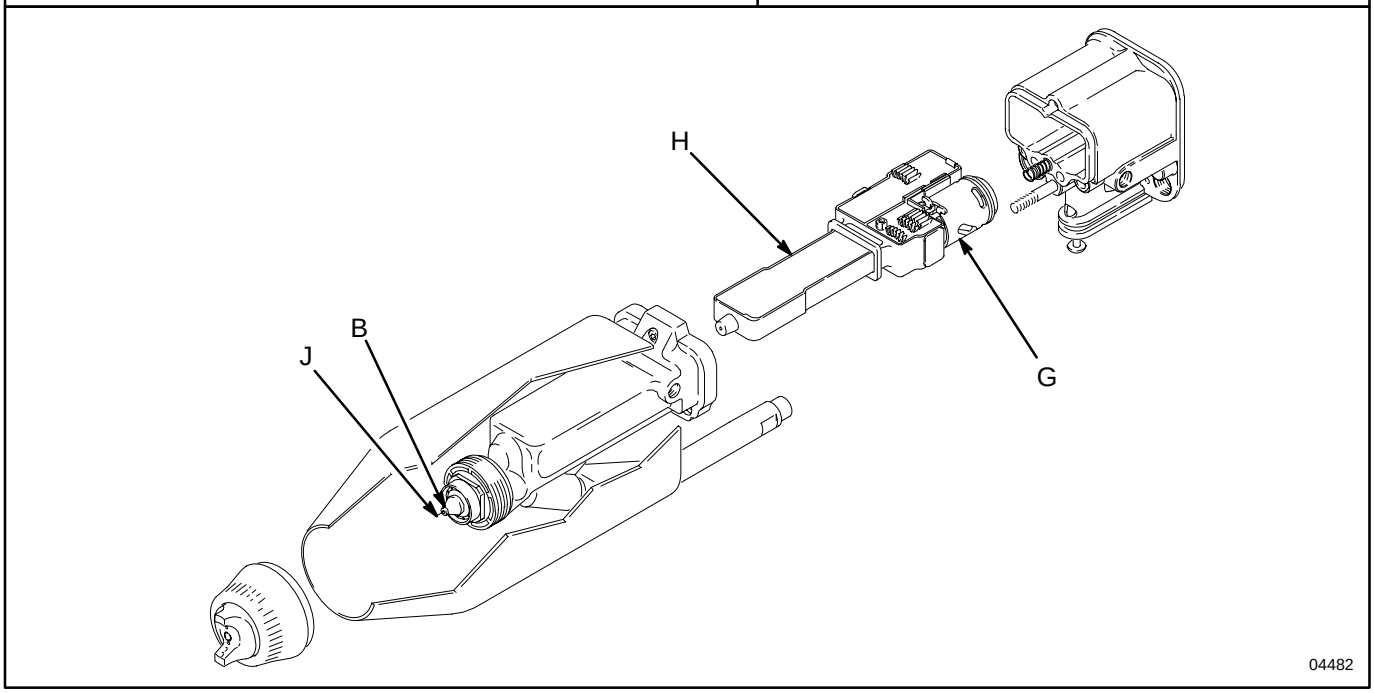
The turbine air is exhausted into the shroud (D) and out the back of the manifold through the fitting marked "EXH", unless you are using part no. 238091 spray gun, then the air is exhausted out of the slot in the bottom of the shroud. The exhaust air helps keep contaminants out and helps keep the gun clean.

Introduction





Manifold Back View



KEY

A Air Cap
B Fluid Nozzle
C Retaining Nut
D Shroud
E Mounting Bracket
F Manifold
G Turbine
H Power Supply
J Electrode

Manifold Markings

A1 Atomization Air Inlet Fitting
A2 Fan Air Inlet Fitting
CYL Cylinder Air Inlet Fitting
EXH (PA) Shroud Exhaust Outlet or Pilot Air Inlet Fitting
F.O. Fiber Optic Fitting
P1 Fluid Supply Inlet Fitting
TA Turbine Air Inlet Fitting
KV *not used*
P2 *not used*

Introduction

Gun Features and Options

(Refer to page 7)

- The gun is designed for use with a reciprocator, and it can be directly mounted to a one-half inch rod. With additional brackets, the gun can be mounted for robotic applications.
- The gun is designed for quick-disconnect, which enables the operator to quickly remove the spray gun without disconnecting the fluid and air lines to the gun.
- The gun functions are activated from a separate controller that sends the appropriate signal to the actuating solenoids. Refer to Fig. 2, page 10.
- An optional fiber optic readout system can be installed to monitor the gun's spraying voltage. A fiber optic cable connected to the gun manifold carries the signal from the gun to a remote ES (electrostatic) display module. An ES Display Module, part no. 224117, is available and will display the gun's spraying voltage and current. A battery operated ES Display Module, part no. 189762, is also available; it displays the gun's spraying voltage only. Refer to Fig. 3, page 10.
- Part no. 238091 spray gun has a fluid regulator located at the gun barrel inlet. The fluid regulator provides precise fluid control.

⚠ WARNING

ELECTRIC SHOCK HAZARD
To reduce the risk of an electric shock, do not use the Graco ES Display Module readings to determine if your system is discharged. The display modules will only display the system voltage while the guns power supply is operating. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 19, to ensure the system is discharged.

Graco Waterborne Fluid Hose (purchased separately)

A Graco waterborne fluid hose must be used between the voltage isolation system fluid outlet and the spray gun fluid inlet.

This fluid hose consists of three layers (see Fig. 1):

- **Inner Hose Layer (EE):** is a Teflon® tube.
- **Conductive Hose Layer (DD):** covers the Teflon tube.
- **Outer Hose Jacket (FF):** is a protective polyethylene hose cover.

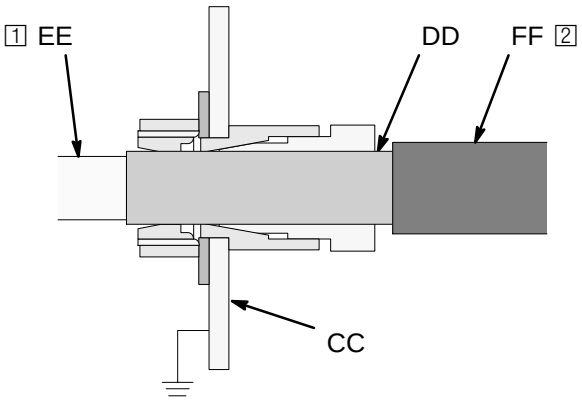
If a hose failure occurs, where the high voltage arcs through the inner hose layer (EE), the voltage will be discharged to ground through the conductive hose layer (DD). When properly installed, the conductive hose layer is grounded through its connection to the grounded safety fence or enclosure (CC). All areas of the fluid hose that are accessible to personnel must be covered by the outer hose jacket (FF) to avoid electric shock.

KEY-Fig. 1

DD Conductive Hose Layer
EE Inner Hose Layer
FF Outer Hose Jacket
CC Grounded Enclosure

[1] The portion of the inner hose layer (EE-Teflon tube) that is not covered by the conductive hose layer (DD), must be inside the safety fence or enclosure (CC).

[2] The areas of the waterborne fluid hose that are accessible to personnel during normal operation must be covered by the outer hose jacket (FF).



H^2O PRO Voltage Block connection shown

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Fig. 1

Installation

Installing the System

⚠ WARNING

ELECTRIC SHOCK HAZARD
Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury if the work is not performed properly.

- Do not install or service this equipment unless you are trained and qualified.
- Comply with all local, state, and national codes for the installation of electrical apparatus in a Class I, Group D, Hazardous Location.
- Comply with all applicable local, state, and national fire, electrical, and other safety regulations.

Fig. 2, page 10, shows a typical Model PRO 5500wb waterborne system. Fig. 3 shows the optional ES Display Modules. The particular type and size system for your operation must be custom designed for your needs. For assistance in designing a system, contact your Graco representative.

Accessories are available from your Graco representative. Refer to the Product Data Sheet for the gun, Form No. 305678.

Basic Guidelines

When spraying waterborne fluids electrostatically:

- The gun must be connected to a voltage isolation system, which isolates the fluid supply from ground and allows voltage to be maintained at the tip of the gun.
- The gun must be connected to a voltage isolation system that will discharge the system voltage when the gun is not in use.
- All components of the isolation system that are charged to high voltage must be contained within a fence or enclosure that prohibits personnel from making contact with the high voltage components before the system voltage is discharged.
- The gun turbine air supply must be interlocked with the isolation system to shut off the turbine air supply anytime the isolation system enclosure or safety fence is opened.
- The voltage isolation system must be interlocked with the spray area entrance to automatically discharge the voltage and ground the fluid whenever someone enters the spray area.
- The system should not have any severe arcing occurring when the isolation mechanism opens and closes. Severe arcing will shorten the life of the system components.

Warning Signs

Mount the warning signs, part no. 186118 and 290171, at the entrance to the spray booth, where it can easily be seen and read by all operators. Additional warning signs are available at no charge.

Ventilate the Spray Booth

⚠ WARNING

TOXIC FLUID HAZARD
Provide fresh air ventilation to avoid the buildup of toxic vapors. Do not operate the gun unless the ventilating fans are on.

Electrically interlock the gun turbine air supply with the ventilators to prevent operation of the electrostatic power supply unless the ventilating fans are on.

Check and follow all local, state, and national codes regarding air exhaust velocity requirements. High velocity air exhaust will decrease the operating efficiency of the electrostatic system. The minimum allowable air exhaust velocity is 60 linear feet/minute (18.3 linear meters/minute).

Installation

BASIC SYSTEM

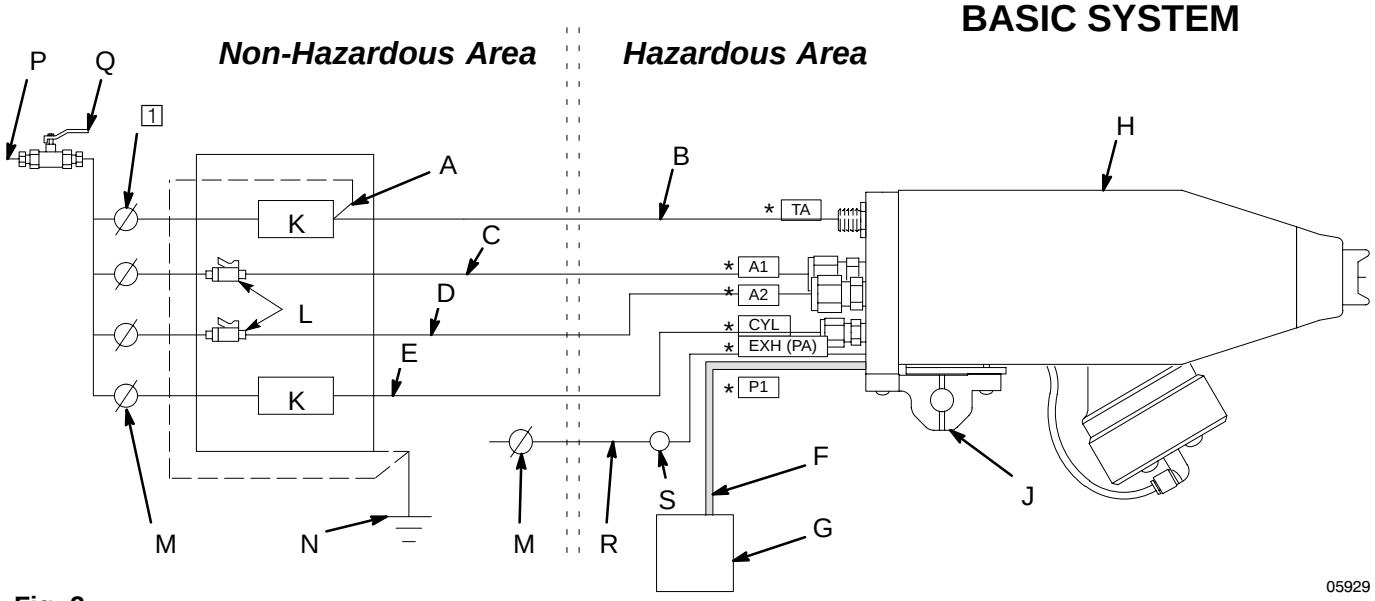


Fig. 2

SYSTEM OPTION
ES Display Module

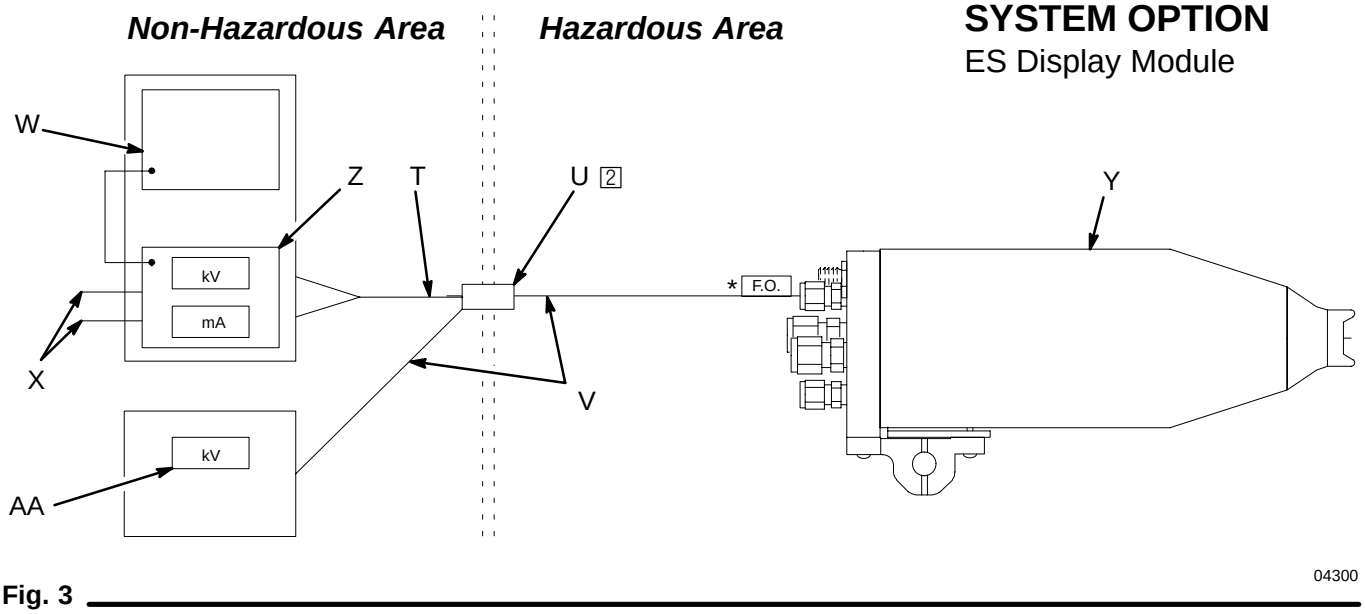


Fig. 3

KEY

A Ground Wire on Graco Electrically Conductive Air Hose
B Graco Electrically Conductive Air Hose (Turbine Air Hose), P/N 235068 to 235074, color coded red
C Atomizing Air Hose, 3/8 inch (9.5 mm) O.D.
D Fan Air Hose, 3/8 inch (9.5 mm) O.D.
E Cylinder Air Hose, 1/4 inch (6.4 mm) O.D.
F Graco Waterborne Fluid Hose, see page 56 for parts
G Graco H^2O PRO Voltage Block Isolation System
H PRO 5500wb Spray Gun
J Mounting Bracket for 1/2 inch (127 mm) rod, P/N 189581
K Solenoid Valve-requires quick-exhaust port
L Bleed-type Air Shut-off Valve
M Air Pressure Regulator for fluid regulator pilot
N True Earth Ground
P Main Air Line
Q Bleed-type Master Air Valve
R Shroud Exhaust Port for Gun P/N 237603 or Pilot Air Line for Gun P/N 238091; 1/4 inch (6.4 mm) O.D.
S Check Valve
T Fiber Optic Cable, P/N 224680 to 224686
U Bulkhead, P/N 189870
V Fiber Optic Cable, P/N 224670 to 224676
W 24 Volt Power Supply, P/N 235301
X 4–20 mA Outputs
Y PRO 5500wb Spray Gun
Z Full Feature ES Display Module, P/N 224117
AA kV Only ES Display Module (battery operated), P/N 189762
[1] The turbine air supply must be interlocked with the spray booth ventilation fans and the voltage isolation system.
[2] A maximum of two splices with a total of 108 feet (32.94 m) of cable can be used. For the strongest light signals, use a minimum number of bulkhead splices.
* See page 12 for a description of the manifold connections.

Installation

Install the Air Line Accessories

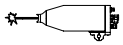
1. Install an air line filter and an air and water separator on the main air supply line to ensure a dry, clean air supply to the gun. Dirt and moisture can ruin the appearance of your finished workpiece and can cause the gun to malfunction.

2. Install a bleed-type air shutoff valve (Q) on the main air supply line to shut off all the air to the gun.

3. Install a bleed-type air regulator (M) on each of the gun air supply lines to control the air pressure to the gun. See Fig. 2, page 10.

4. Install a bleed-type air shutoff valve (L) on the fan (C) and atomization (D) air lines to shut off the fan and atomization air to the gun.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
Trapped air can cause the gun to spray unexpectedly, which could result in a serious injury, including splashing in the eyes or on the skin. The bleed-type air shutoff valve is required on the fan and atomization air lines so trapped air will be relieved between the valve and the gun after the valves are closed.

5. Install a check valve (S) in the pilot air line (R) to prevent fluid from backing up into the air controls.

Install the Gun and Mounting Bracket

⚠ CAUTION

To avoid electrical breakdown damage to the fluid regulator and other gun components, do not have any grounded objects within the minimum clearance zone shown in Fig. 4 during gun operation.

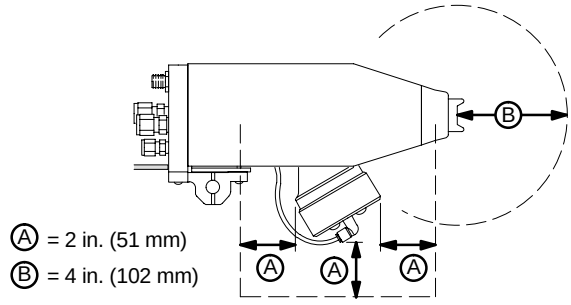


Fig. 4

1. Loosen the two square head bolts (103), and slide the mounting bracket onto a 0.50 inch (12.7 mm) mounting rod. See Fig. 5.

2. Position the gun, and tighten the two bolts (103) securely.

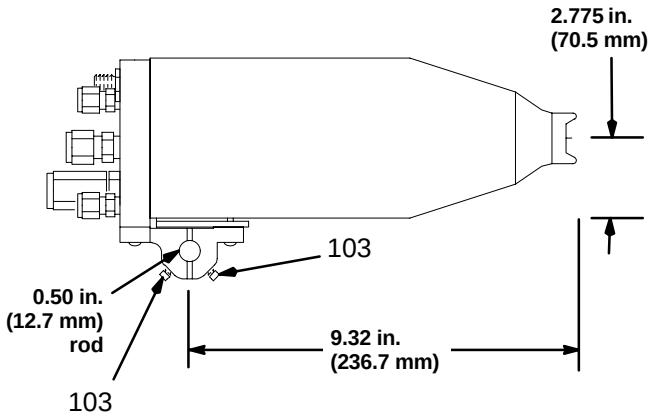


Fig. 5

NOTE: For added positioning reliability, the mounting bracket (DD) has an 1/8 inch (3.2 mm) slot where a locating pin (BB–not included) can be inserted through the mounting rod (CC). See Fig. 6.

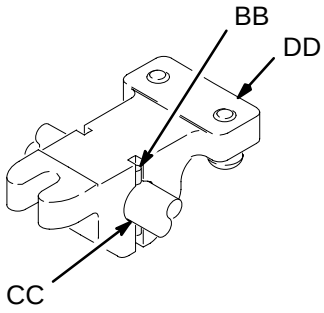


Fig. 6

Installation

Connect the Air Lines

See Fig. 2, page 10, for a schematic of air line connections. Connect the air lines to the gun manifold as instructed at right.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

To reduce the risk of a fire, explosion, or electric shock, the gun turbine air supply must be interlocked with:

- The isolation system to shut off the turbine air supply anytime the enclosure or safety fence is opened.
- The ventilators to prevent operation of the power supply unless the ventilating fans are on.

Graco Electrically Conductive Air Hose

⚠ WARNING

ELECTRIC SHOCK HAZARD

To reduce the risk of an electric shock or other serious injury, you must use the red-colored Graco Electrically Conductive Air Hose for the turbine air hose, and you must connect the hose ground wire to a true earth ground. Do not use the black or grey-colored Graco air hoses.

Connect the red-colored Graco Electrically Conductive Air Hose (B) to the gun turbine air inlet and connect the hose ground wire (A) to a true earth ground (N). Refer to Fig. 2, page 10. Check the electrical grounding of the gun as instructed on page 18. See page 57 to order the air hose.

NOTE: The hose and the gun have special left-hand threads to prevent connecting another type of air hose to the gun turbine air inlet.

Manifold Connections (See Fig. 7)

A1 **Atomization Air Inlet Fitting**
Connect a 3/8 inch (9.5 mm) O.D. tube between the fitting and the air supply.

A2 **Fan Air Inlet Fitting**
Connect a 3/8 inch (9.5 mm) O.D. tube between the fitting and the air supply.

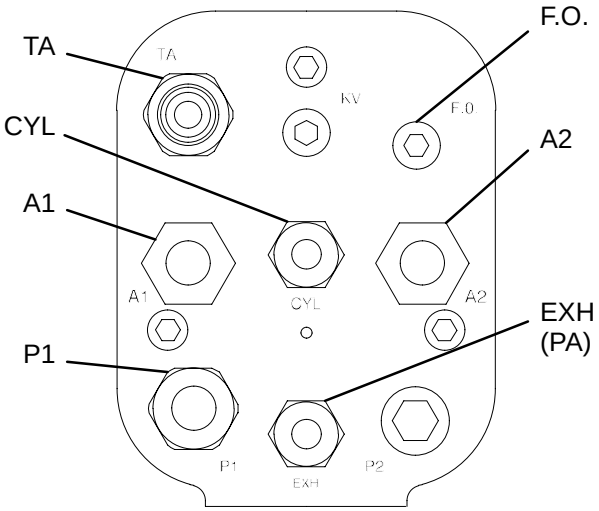
CYL **Cylinder Air Inlet Fitting**
Connect a 1/4 inch (6.4 mm) O.D. tube between this fitting and the solenoid. For quicker trigger response, use the shortest hose length possible.

EXH (PA) **Shroud Exhaust Outlet or Pilot Air Inlet Fitting**
If using part no. 238091 spray gun, which includes a fluid regulator, connect a 1/4 inch (6.4 mm) O.D. pilot line to the fitting to control the fluid outlet pressure. If using part no. 237603 or 236824 spray gun, connect a 1/4 inch O.D. (6.4 mm) x 4 foot (1.22 m) long exhaust tube to the fitting.

F.O. **Fiber Optic Fitting (Optional)**
Connect the Graco Fiber Optic Cable as instructed on page 13.

P1 **Fluid Supply Inlet Fitting**
Connect a Graco waterborne fluid supply hose as instructed on page 15.

TA **Turbine Air Inlet Fitting**
Connect the red Graco Electrically Conductive Air Hose between this fitting (left-hand thread) and the solenoid. Connect the air hose ground wire to a true earth ground.



Manifold Back View

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Fig. 7

Optional Fiber Optic Cable Connection

⚠ WARNING

ELECTRIC SHOCK HAZARD
To reduce the risk of an electric shock, do not use the Graco ES Display Module readings to determine if your system is discharged. The display modules will only display the system voltage while the guns power supply is operating. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 19, to ensure the system is discharged.

An optional fiber optic fitting (124) is shipped unassembled with the gun. If an ES (kV) display module is used, install the fitting in the manifold. See Fig. 3, page 10, for a schematic of the fiber optic connections.

1. Remove the 1/8 npt plug (115) from the manifold's fiber optic port, and install the black fiber optic fitting (124). See Fig. 8.

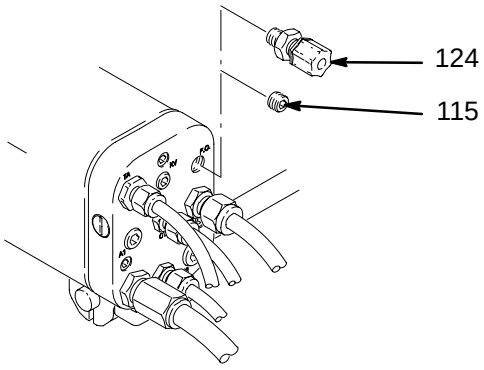


Fig. 8

2. Remove the nut (EE) from the fiber optic fitting (124), and slide the nut over the end of the fiber optic cable (FF). See Fig. 9.

3. Insert the cable (FF) into the fitting (124), and push the cable in until it bottoms out. Tighten the nut (EE) to secure the cable.

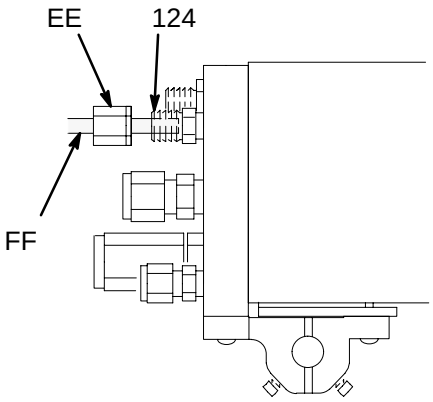


Fig. 9

4. If you have two bulkhead splices in your system, it is recommended that you install the fiber optic lens kit, as described on page 14.

NOTE: Most of the fiber optic light transmission loss occurs at the bulkhead splices. For the strongest light signals, use a minimum number of bulkhead splices. A maximum of two splices, with a total of 108 feet (32.94 m) of cable, is recommended.

5. See manual 308265 to install a Graco ES Display Module.

Installation

Optional Fiber Optic Lens Kit Installation

NOTE: The fiber optic lens kit is not included with the gun. Order it separately; the part number is 236852.

1. Remove the gun from the manifold as instructed on page 35.
2. Make sure the lens (HH) is clean. Push the lens into the counterbore (KK) in the manifold fiber optic port (GG). See Fig. 10 and 11.
3. Press the lens retainer (JJ) into the manifold fiber optic port (GG) until it is flush with the manifold surface.
4. Assemble the gun to the manifold as instructed on page 44.

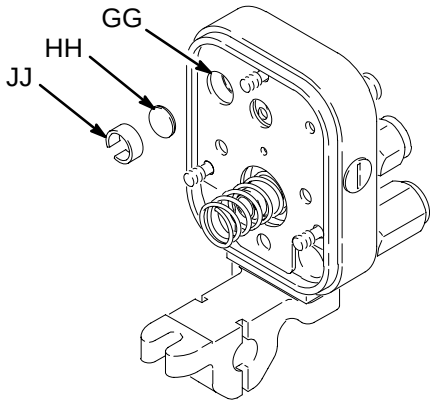


Fig. 10 04484

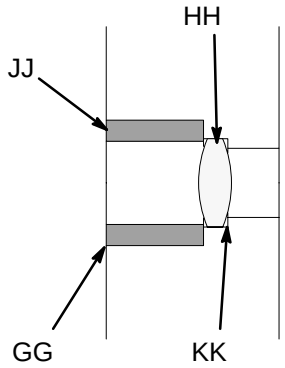


Fig. 11 04485

Installation

Install the Fluid Hose

NOTE:

- A Graco waterborne fluid hose must be used between the voltage isolation system fluid outlet and the spray gun fluid inlet. See page 56 to order the Graco waterborne fluid hoses and the hose replacement parts.

- Before connecting the fluid supply line to the gun, blow it out with air, and flush it with water to remove contaminants.

⚠ WARNING

ELECTRIC SHOCK HAZARD
To reduce the risk of an electric shock, install only one continuous Graco waterborne fluid hose between the isolated fluid supply and the spray gun. Do not splice hoses together.

1. For the fluid hose to seal properly, the hose must be stripped and assembled to the dimensions shown in Fig. 12. A new Graco waterborne fluid hose comes fully assembled to the proper dimensions.

⚠ CAUTION

Be careful not to cut into the inner hose layer (K) when stripping the hose. Nicks or cuts in the tube will cause premature hose failure.

2. Inspect the condition of the o-rings (G) on the hose barbed-fitting. Replace the o-rings if they are worn or damaged.

3. Unscrew the strain relief nut (L) from the fluid inlet fitting (P1), and slide the nut onto the hose (H). See Fig. 13.

4. Apply a light coat of dielectric grease (supplied with the gun) to the entire length of the exposed inner hose layer (K). See Fig. 12.

[1] Apply a light coat of dielectric grease to the o-rings (G) and the entire length of the inner hose layer (K)

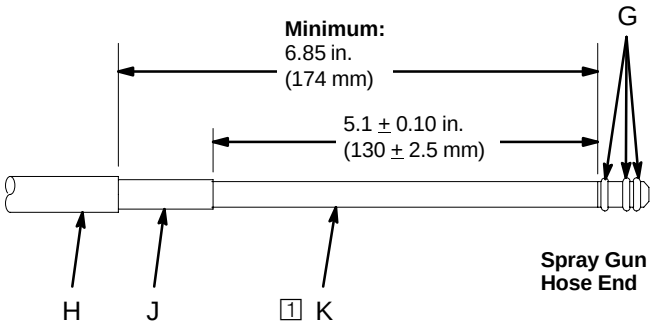


Fig. 12

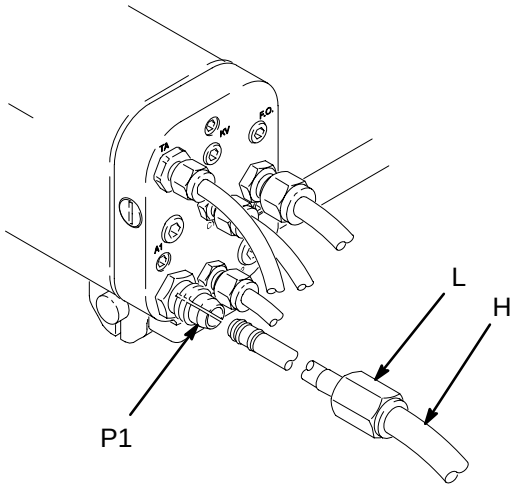


Fig. 13

Installation

Install the Fluid Hose (continued)

5. Insert the hose into the fluid inlet fitting (P1). See Fig. 14.

6. Push the hose into the fitting until the o-rings (G) on the hose barbed-fitting are seated and the hose bottoms out.

⚠ WARNING

ELECTRIC SHOCK HAZARD
To maintain grounding continuity, the conductive hose layer (J) must be engaged in the fitting (P1) when the nut (L) is tightened. See Fig.14. Failure to properly install the hose into the fitting could result in an electric shock.

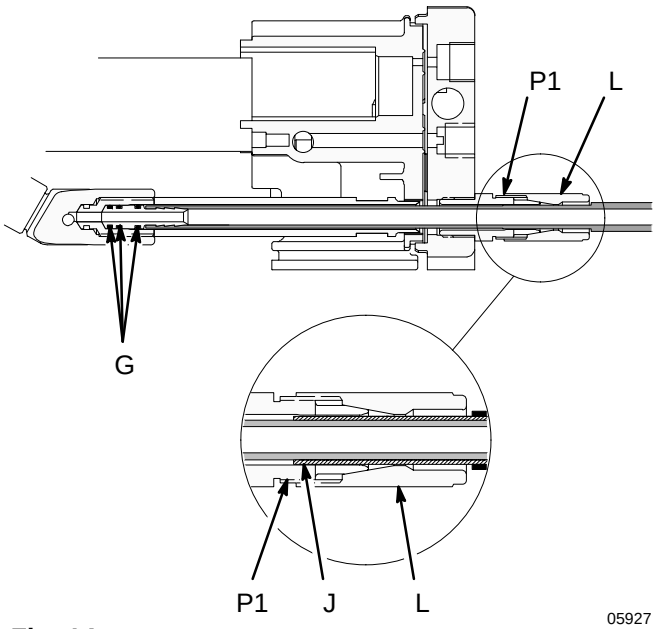


Fig. 14

7. Tighten the nut (L) firmly with a wrench to about 55 in-lb (6.2 N•m). Pull back on the hose to make sure it is secure.

⚠ CAUTION

If the hose comes loose from the fitting, fluid leakage will occur. Make sure the nut (L) is tight and that nothing will pull or catch on the hose during operation.

8. Check the gun's electrical grounding as instructed on page 18.

9. Connect the other end of the hose as instructed in the voltage isolation system manual. See Fig. 15.

⚠ WARNING

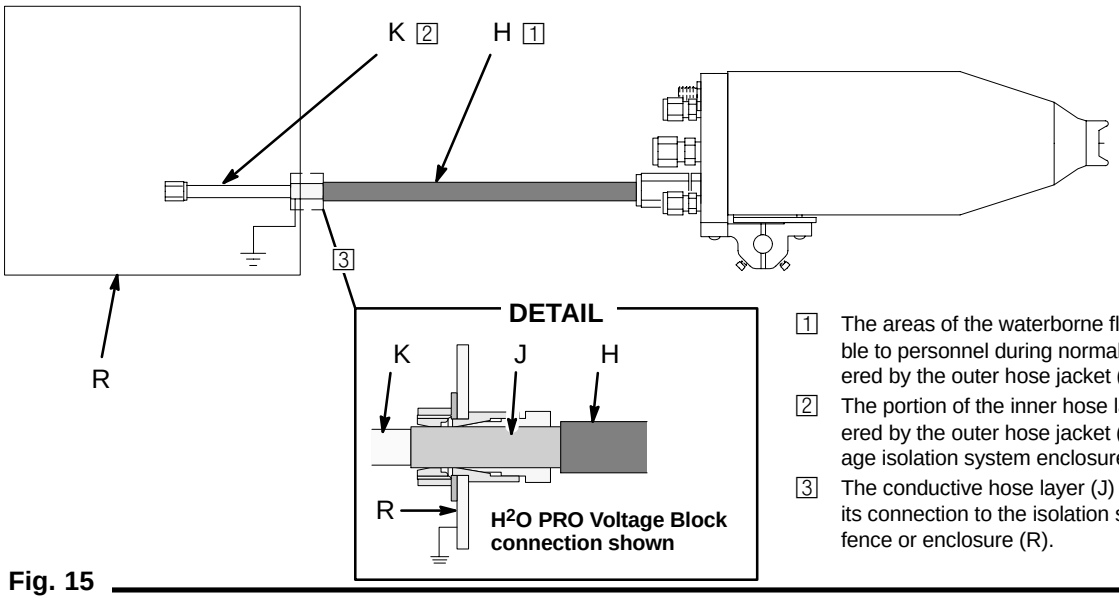
ELECTRIC SHOCK HAZARD
To reduce the risk of an electric shock, the areas of the waterborne fluid hose that are accessible to personnel during normal operation must be covered by the outer hose jacket (H). See Fig. 15.

⚠ CAUTION

The Graco warranty is void if the spray gun is connected to a non-Graco voltage isolation system or if the gun is operated above 60 kV.

Installation

Install the Fluid Hose (continued)



1. The areas of the waterborne fluid hose that are accessible to personnel during normal operation must be covered by the outer hose jacket (H).
2. The portion of the inner hose layer (K) that is not covered by the outer hose jacket (H) must be inside the voltage isolation system enclosure (R).
3. The conductive hose layer (J) must be grounded through its connection to the isolation system's grounded safety fence or enclosure (R).

04574

Fig. 15

Ground the System

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

When operating the electrostatic device, any ungrounded objects in the spray area (such as people, containers, tools, etc.) can become electrically charged. Improper grounding can result in static sparking, which can cause a fire, explosion, or electric shock. Follow the grounding instructions below.

The following grounding instructions are minimum requirements for a basic electrostatic, waterborne system. Your system may include other equipment or objects which must be grounded. Check your local electrical code for detailed grounding instructions. Your system must be connected to a true earth ground.

1. **Fluid Supply:** Ground the fluid supply by connecting a ground wire and clamp between the fluid supply and a true earth ground. See your fluid supply instruction manual for grounding instructions.
2. **PRO 5500wb Electrostatic Air Spray Gun:** Install the red-colored Graco electrically conductive air hose between the gun and air supply line and connect the air hose ground wire to a true earth ground. Check the electrical grounding of the gun as instructed on page 18.
3. **Graco Waterborne Fluid Hose:** The conductive layer of the hose must be properly grounded by correct installation as instructed on pages 15 to 17.
4. **Voltage Isolation System:** Ground the system according to the manufacturer's instructions.
5. **All persons entering the spray area:** Their shoes must have conductive soles, such as leather, or personal grounding straps must be worn. Rubber or plastic soles are not conductive.
6. **Object being sprayed:** Keep the workpiece hangers clean and grounded at all times. Contact points must be sharp points or knife edges.
7. **The floor of the spray area:** The floor must be electrically conductive and grounded. Do not cover the floor with cardboard or any non-conductive material which would interrupt grounding continuity.
8. **All electrically conductive objects or devices in the spray area:** They must be properly grounded.

Installation

Check the Electrical Grounding

1. Have a qualified electrician check the electrical grounding continuity of the gun and turbine air hose (M). See Fig. 16.
2. Make sure the turbine air hose (M) [the red Graco electrically conductive air hose] is connected and the hose ground wire is connected to a true earth ground.
3. The air and fluid supplies to the gun must be turned off and the fluid hose must not have any fluid in it when checking the continuity.
4. Measure the resistance between the turbine air inlet fitting (N) and a true earth ground (P) with an ohmmeter (Q). Resistance should not exceed 100 ohms.
5. If the resistance is greater than 100 ohms, check the tightness of the ground connections, and be sure the turbine air hose ground wire is connected to a true earth ground. If the resistance is still too high, replace the turbine air hose.

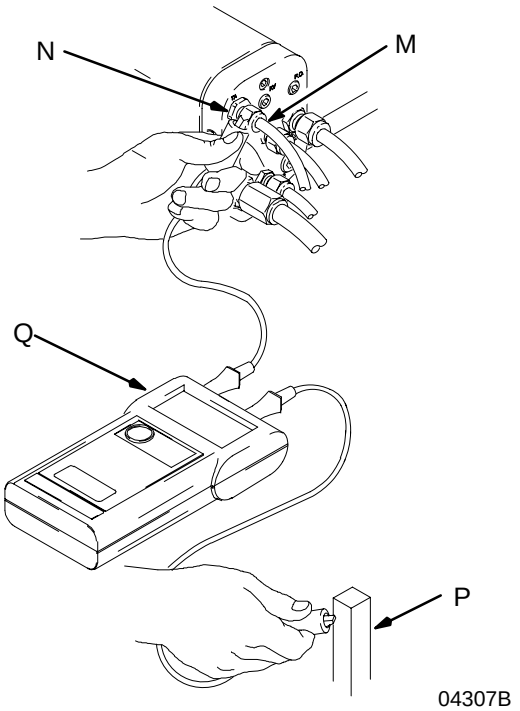


Fig. 16

Install the Fabric Cover

(Part No. 237603 and 236824 Guns Only)

1. Install a fabric cover (AA) over the front of the gun, and slide it back to cover the exposed tubing and hoses at the back of the manifold. See Fig. 17.
2. Route the exhaust tube (BB) outside the cover. This enables you to monitor the exhaust tube for the presence of any paint or solvent. See **Check for Fluid Leakage** on page 25. Strap down the exhaust tube to prevent it from moving around.

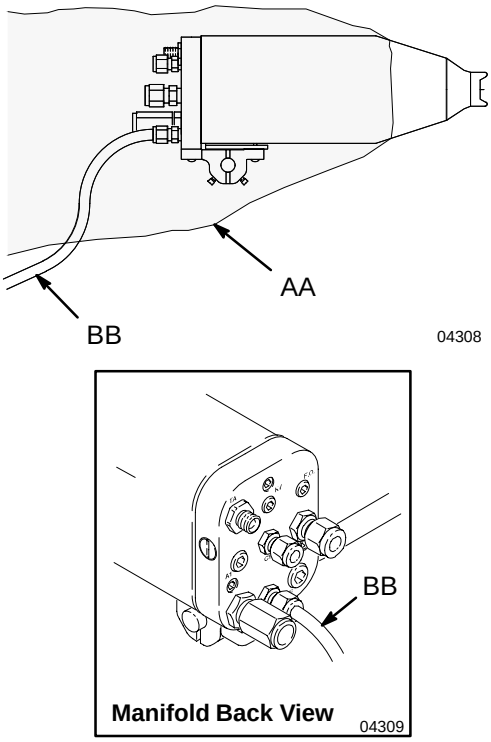


Fig. 17

Operation

Fluid Voltage Discharge and Grounding Procedure

⚠ WARNING

ELECTRIC SHOCK HAZARD
The high voltage fluid supply is charged with high voltage until the voltage is discharged. Contact with the charged components of the isolation system or spray gun electrode will cause an electric shock. To avoid an electric shock, follow the **Fluid Voltage Discharge and Grounding Procedure**:

- when instructed to discharge the voltage,
- before cleaning, flushing, or servicing the system equipment,
- before approaching the front of the gun or the gun-mounted fluid regulator,
- and before opening the safety fence or the enclosure for the isolated fluid supply.

NOTE: An accessory grounding rod, part no. 210084, is available to discharge any voltage remaining on a system component. Contact your Graco representative to order it.

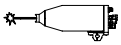
1. Turn off the turbine air to all of the spray guns connected to the isolated fluid supply.

2. Discharge the voltage at the voltage isolation system by following the procedure specified in the voltage isolation system instruction manual.

3. Touch the electrode of the gun with a grounded rod to make sure that the voltage has been discharged. If an arc is seen, verify that the electrostatics are turned off or see **Electrical Troubleshooting**, page 29, or the voltage isolation system manual for other possible problems. Resolve the problem before proceeding.

Pressure Relief Procedure

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. To reduce the risk of an injury from accidental spray from the gun, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment,
- or install or clean the fluid nozzle.

1. Follow the **Fluid Voltage Discharge and Grounding Procedure**, at left.

2. Relieve fluid pressure in the fluid supply and voltage isolation system as instructed in their instruction manuals.

3. Turn off the fluid supply to the gun.

4. Turn off all the air to the spray gun except the cylinder air, which triggers the gun. If an air pilot regulator is used in the system, the air pressure is also needed at the regulator air inlet.

NOTE: The shut-off device must bleed the air out of the system.

5. Trigger the gun into a grounded metal waste container to relieve fluid pressure.

6. Turn off all the remaining air supplies to the gun.

7. Turn off the main air supply by closing the bleed-type master air valve on the main air supply line. Leave the valve closed until you are ready to spray again.

Operation

Operating Checklist

Check the following list daily, before starting to operate the system, to help ensure you of safe, efficient operation.

____ 1. All the operators are properly trained to safely operate an automatic, electrostatic, waterborne, air spray system as instructed in this manual and the voltage isolation system manual.

____ 2. All the operators are trained how to properly relieve system pressure as instructed on page 19.

____ 3. All the operators are trained how to properly discharge the voltage as instructed on page 19.

____ 4. The system is thoroughly grounded and the operator and all persons entering the spray area are properly grounded. See **Ground the System**, page 17, and **Check the Electrical Grounding**, page 18.

____ 5. The condition of the electrical components of the spray gun has been checked as instructed in **Electrical Tests**, page 33.

____ 6. All fluid hose connections are tight.

____ 7. The ventilation fans are operating properly.

____ 8. All the debris, including flammable liquids and rags, is removed from the spray area.

____ 9. The manifold exhaust tubes have been checked for the presence of fluid as instructed in **Check for Fluid Leakage**, page 25**.**

Selecting a Fluid Nozzle and Air Cap

Part no. 237603 and 236824 spray guns are supplied with a 0.07 inch (1.8 mm) fluid nozzle, part no. 191834. *Part no. 238091 spray gun* is supplied with a 0.047 inch (1.2 mm) fluid nozzle, part no. 191832. The air cap for all the guns is part no. 193033. If your application requires a different nozzle and air cap combination, see instruction manual 307803 or consult your authorized Graco distributor to select the appropriate fluid nozzle and air cap. Install the air cap and fluid nozzle into the gun barrel as instructed on page 36.

Operating the Spray Gun

⚠ WARNING

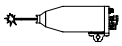
FIRE AND EXPLOSION HAZARD
To reduce the risk of fire and explosion, only use this equipment to spray nonflammable, waterborne fluids as defined on the front cover of this manual.

⚠ WARNING

ELECTRIC SHOCK HAZARD
Contact with the charged components of the spray gun will cause an electric shock.

- Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 when you stop spraying and whenever you are instructed to discharge the voltage.
- Do not come within 2 ft. (610 mm) of the gun nozzle or gun-mounted fluid regulator during gun operation or until after following the **Fluid Voltage Discharge and Grounding Procedure**.
- Do not use the Graco ES Display Module readings to determine if your system is discharged. Follow the **Fluid Voltage Discharge and Grounding Procedure** to ensure the system is discharged.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 when you stop spraying, before installing or cleaning the fluid nozzle, and whenever you are instructed to relieve the pressure.

⚠ WARNING

COMPONENT RUPTURE HAZARD
To reduce the risk of component rupture, which can cause serious injury, do not exceed the maximum working pressure of the lowest rated system component. This equipment has a **100 psi (0.7 MPa, 7 bar) maximum working air and fluid pressure**.

Operation

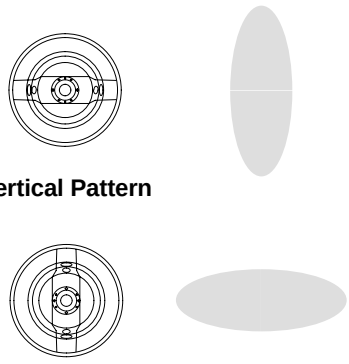
Operating the Spray Gun (continued)

Follow the steps below to establish the correct fluid flow and air flow. **Do not** turn on the turbine air/electrostatics (TA) yet.

> **⚠ CAUTION**
>
> If any fluid leakage from the gun is detected, stop spraying immediately. See **Check for Fluid Leakage**, page 25.

1. Complete all the checks under the **Operating Checklist** on page 20.

2. Make sure the system voltage is discharged. Loosen the air cap retaining nut, and rotate the air cap for a vertical or horizontal spray pattern. See Fig. 18. Then tighten the retaining nut until the air cap is held firmly in place; you should not be able to rotate the air cap horns by hand.



Vertical Pattern

Horizontal Pattern

02020

Fig. 18

3. Apply a minimum of 50 psi (345 kPa, 3.5 bar) air pressure to the cylinder air fitting (CYL) to activate the on/off sequence of atomization air (A1), fan air (A2), and fluid (P1). Refer to Fig. 19.

4. Turn the gun functions off and on by using the air solenoid valves on the cylinder (CYL) and turbine (TA) air supply lines. Refer to Fig. 2, page 10.

NOTE: To trigger the fluid alone, shut off and relieve the air pressure to the atomization (A1) and fan (A2) air lines, using the bleed-type air shut-off valves. Apply 50 psi (345 kPA, 3.5 bar) air pressure to the cylinder air fitting (CYL) to trigger the fluid.

5. **Part No. 237603 and 236824 Spray Guns:** Pressurize the fluid supply, and adjust the fluid flow with the fluid pressure regulator installed in the fluid line.

   Part No. 238091 Spray Gun: Set the fluid supply pressure to the gun at 70 to 80 psi (480 to 550 kPa, 4.9 to 5.6 bar). Control the fluid flow out of the gun by adjusting the air pilot pressure to the gun-mounted fluid regulator. Increase or decrease the pilot air pressure until you have the desired flow rate.

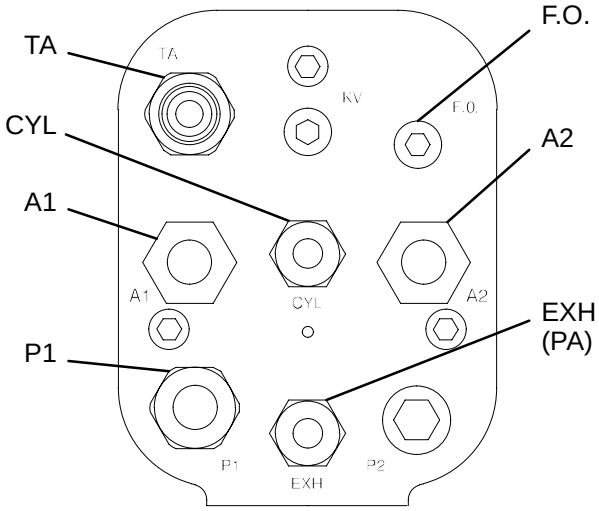
   NOTE: The fluid regulator has a air bleed hole in the cover, which will emit some air leakage.

6. Use the air pressure regulator on the atomization air supply line (A1) to adjust the degree of atomization. For example, for a fluid flow rate of 10 ounces per minute (0.3 liters/min.), a typical atomization pressure would be about 20 to 30 psi (140 to 210, 1.4 to 2.1 bar) at the gun manifold.

7. Use the air pressure regulator on the fan air supply line (A2) to adjust the pattern size.

NOTES:

- For the most efficiency, always use the lowest atomizing air pressure possible.
- When increasing to a wide, flat pattern, it may be necessary to increase the supply of fluid to the gun to maintain the same amount of coverage over a large area.
- See **Spray Pattern Troubleshooting** on page 32 to correct spray pattern problems.



Manifold Back View

04302

Fig. 19

Continued on the next page.

Operating the Spray Gun (continued)

Activating and Adjusting the Electrostatics

8. Make sure the fan (A2) and atomizing (A1) air are on, then turn on the turbine air (TA).

9. The turbine air pressure should be adjusted to 30 psi (210 kPa, 2.1 bar) at the gun manifold inlet when air is flowing. Do not exceed 40 psi (280 kPa, 2.8 bar) air pressure at the gun manifold inlet as there is no added benefit and turbine life could be reduced.

   Use the chart below to set the proper pressure at the turbine hose inlet. Do not exceed these recommended pressures or turbine life will be reduced.

Turbine Air Hose Length	Dynamic pressure at the turbine hose inlet required for full voltage
15 ft. (4.6 m)	36 psi (251 kPa, 2.5 bar)
25 ft. (7.6 m)	38 psi (265 kPa, 2.6 bar)
50 ft. (15.3 m)	40 psi (280 kPa, 2.8 bar)
75 ft. (22.9 m)	42 psi (294 kPa, 2.9 bar)
100 ft. (30.5 m)	45 psi (314 kPa, 3.1 bar)

10. Check the voltage output of the gun using a high voltage probe and meter or by reading the ES (kV) Display Module.

NOTES:

- The gun's normal high voltage reading is 45 to 55 kV due to spraying current demands and isolation system losses.
- See **Voltage Loss Troubleshooting** on page 26 to correct voltage problems.

⚠ CAUTION

The Graco warranty is void if the spray gun is connected to a non-Graco voltage isolation system or if the gun is operated above 60 kV.

11. Operate the voltage isolation system as instructed in the system manual.

12. Use the same spraying technique you would use with a conventional air spray system to coat the workpiece.

13. Relieve the pressure and discharge the voltage when you stop spraying.

NOTE: Flush and clean the equipment by following the instructions in the **Maintenance** section, pages 23 to 25.

Maintenance

Daily Care and Cleaning

⚠ WARNING

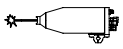
FIRE AND EXPLOSION HAZARD
To reduce the risk of fire and explosion:

- Only flush, purge, or clean the spray gun with non-flammable fluids, as defined on the front cover of this manual.
- Do not flush with the turbine air (TA) to the gun turned on.

⚠ WARNING

ELECTRIC SHOCK HAZARD
Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 before cleaning or flushing the gun to ensure the voltage is discharged and avoid serious injury from an electric shock.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 when you stop spraying, before installing or cleaning the fluid nozzle, and whenever you are instructed to relieve the pressure.

1. Clean the fluid and air line filters daily.

2. Clean the outside of the gun daily with a soft cloth dampened in a non-flammable cleaning fluid.

3. Clean the air cap and fluid nozzle daily, minimum, as instructed on page 24. Some applications require more frequent cleaning. Replace the fluid nozzle and air cap if they are damaged. See page 36.

4. Check the electrode wire. Straighten it if it is bent and replace it if it is broken or damaged. See page 37.

⚠ CAUTION

Fluid in the air passages could cause the gun to malfunction and could draw current and reduce the electrostatic effect. Fluid in the power supply cavity can reduce the alternator life. Whenever possible, point the gun down while cleaning it. Do not use any cleaning method which could allow fluid into the gun air passages.

Do not point the gun up while cleaning it.

04311

Do not immerse the gun in fluid.

04310

Do not wipe the gun with a cloth that is heavily saturated; wring out the excess fluid.

02027

5. Check for any fluid leakage from the gun and fluid hoses. See page 25. Tighten the fittings or replace the equipment as needed.

6. Check all of the work hangers for a buildup of fluid; clean them if necessary.

7. Flush the gun before changing colors and whenever you are done operating the gun.

Maintenance

Clean the Air Cap and Fluid Nozzle

Equipment needed:

- Soft bristle brush
- Non-flammable cleaning fluid

⚠ CAUTION

03511

Do not use metal tools to clean the air cap or fluid nozzle holes as this could scratch them, and make sure the electrode wire is not damaged. Scratches in the air cap or nozzle or a damaged electrode wire can distort the spray pattern.

Procedure:

1. Relieve the pressure and discharge the system voltage as instructed on page 19.

2. Remove the air cap assembly (1, 12) and gun shroud (2). See Fig. 20.

3. Clean the fluid nozzle (14), shroud (2), and exterior of the gun (P) with a cloth dampened in a non-flammable cleaning fluid. Avoid getting any fluid into the air passages. Whenever possible, point the gun down while cleaning it.

4. If it appears that there is fluid inside the fluid nozzle (14) air passages, remove the gun from the line for servicing.

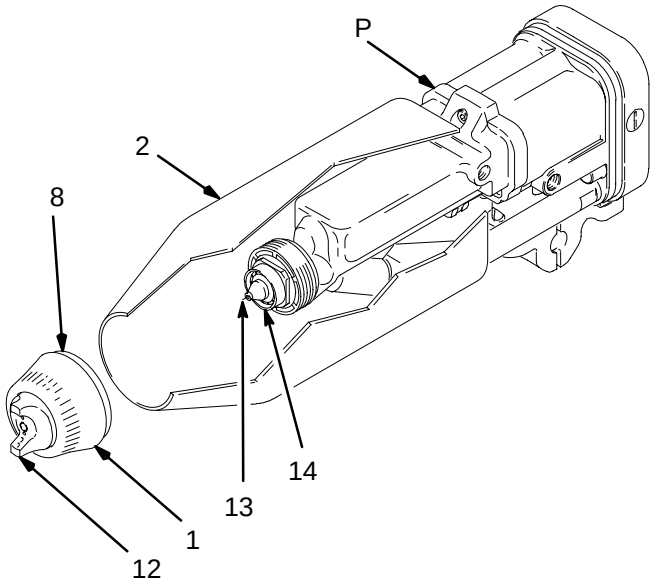
5. Clean the air cap (12) with the soft bristle brush and a compatible solvent or submerge the air cap in the solvent and wipe it clean.

6. Slide the shroud (2) onto the gun (P).

7. Carefully install the air cap (12). Be sure to insert the electrode (13) wire through the *center* air cap hole and do not bend the wire. Rotate the air cap horns to the desired position.

8. Make sure the o-ring (8) is in place on the retaining nut (1). Tighten the retaining nut (1) until the air cap is held firmly in place; you should not be able to rotate the air cap horns by hand.

9. Test the gun resistance as instructed on page 33.



04312

Fig. 20

Maintenance

Check for Fluid Leakage (See Fig. 21)

⚠ CAUTION

If any fluid leakage from the gun is detected, stop spraying immediately.

⚠ WARNING

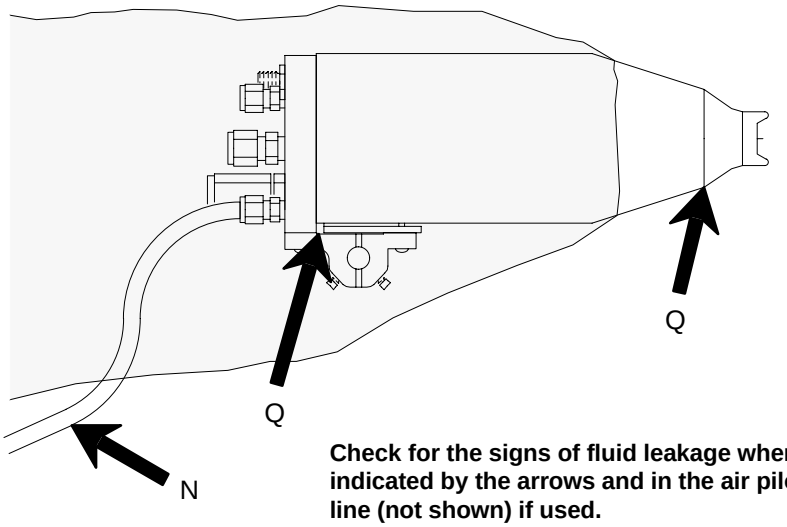
ELECTRIC SHOCK HAZARD
Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 whenever you are instructed to discharge the voltage to avoid serious injury from an electric shock.

⚠ WARNING

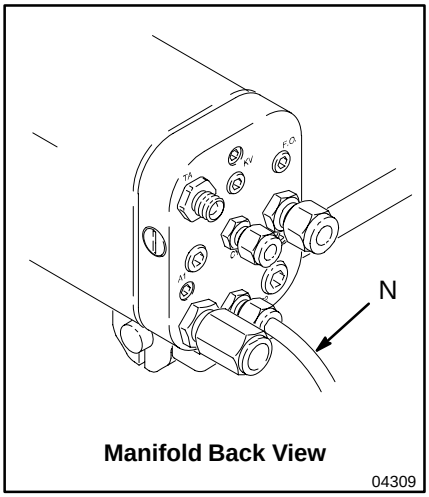
PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 whenever you are instructed to relieve the pressure.

During operation, periodically check the manifold exhaust tube (N) and both ends of the gun shroud (Q) for the presence of fluid. Fluid in these areas would indicate fluid leakage into the shroud, which could be caused by leaks at the fluid tube connections or fluid packing leakage. If an air pilot line is used, check it for the presence of fluid also.

If fluid is seen in any of these areas, stop spraying immediately. Relieve the pressure and discharge the voltage, then remove the gun for repair.



Check for the signs of fluid leakage where indicated by the arrows and in the air pilot line (not shown) if used.



Manifold Back View

04309

04308

Fig. 21

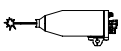
Troubleshooting

⚠ WARNING

ELECTRIC SHOCK HAZARD
Installing and servicing this equipment requires access to parts which may cause an electric shock or other serious injury if the work is not performed properly. Do not install or service this equipment unless you are trained and qualified.

Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 before checking or servicing the system and whenever you are instructed to discharge the voltage to ensure the voltage is discharged and avoid serious injury from an electric shock.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 before checking or servicing the system and whenever you are instructed to relieve the pressure.

Voltage Loss Troubleshooting

Normal spraying voltage for a system using the PRO 5500wb gun is 45 to 55 kV. The system voltage is lower due to spraying current demands and voltage isolation system losses.

A loss of spraying voltage can be caused by a problem with the spray gun, fluid hose, or voltage block, since all of the system components are electrically connected through the conductive, waterborne fluid.

Before troubleshooting or servicing the voltage block itself, you need to determine which component in the system is most likely causing a problem. Possible causes include the following:

Spray Gun

- Fluid leakage
- Dielectric breakdown at the fluid hose connection or fluid packings
- Not enough air pressure for the turbine
- Faulty power supply
- Excessive overspray on gun surfaces
- Fluid in the air passages

Waterborne Fluid Hose

- Dielectric failure of hose (pin-hole leak through Teflon® layer)
- Air gap in the fluid column between the gun and isolated fluid supply, causing a low voltage reading on the isolation system voltage meter.

Voltage Block

- Fluid leakage
- Dielectric breakdown of hoses, seals, or connections
- Isolators not functioning properly

Visual Check
First, check the system for any visible faults or errors to help isolate whether the spray gun, fluid hose or voltage block has failed. A voltage probe and meter, part no. 236003, is helpful for diagnosing voltage problems and is required for some of the troubleshooting tests that follow.

1. Check that all of the air and fluid tubes and hoses are properly connected.

2. Check that the voltage isolation system valves and controls are properly set for operation. Refer to the voltage isolation system manual.

3. Check that the spray gun and voltage isolation system have sufficient air pressure.

4. Check that the gun turbine air is on and the pressure is set correctly.

5. Check that the voltage isolation system's enclosure door or safety fence gate is closed and that any safety interlocks are engaged and working properly.

6. Make sure the voltage isolation system is in the "isolate" mode, where it is isolating the fluid voltage from ground.

Voltage Loss Troubleshooting (continued)

7. To eliminate air gaps in the fluid column, spray enough fluid to purge the air out between the voltage isolation system and the spray gun. An air gap in the fluid hose can break the electrical continuity between the spray gun and the isolated fluid supply and cause a low voltage reading on a voltage meter connected to the isolated fluid supply.

8. Check the spray gun cover and barrel for accumulated overspray. Excessive overspray can create a conductive path back to the grounded gun handle. Install a new gun cover and clean the exterior of the gun.

9. Inspect the entire system for any visible fluid leakage and repair any fluid leaks that are found. Pay special attention to the following areas:

- Packing area of the spray gun
- Fluid hose: check for leakage or any bulges in the outer jacket, which may indicate an internal leak
- Internal voltage isolation system components

Tests

If you still have no voltage, separate the spray gun and hose from the voltage isolation system and check whether the gun and hose alone will hold voltage with the following test.

1. Flush the system with water and leave the lines filled with water.

2. Relieve the pressure and discharge the system voltage as instructed on page 19.

3. Disconnect the fluid hose from the voltage isolation system.

NOTE: Avoid allowing any water to leak out of the fluid hose as that could cause a significant air gap in the fluid column up to the gun electrode, which can break the conductivity path and conceal a potential failure area.

4. Position the end of the hose as far as possible away from any grounded surface. The end of the hose must be at least 1 ft. (305 mm) from any ground. Make sure that no one is within 3 ft. (914 mm) of the end of the hose.

5. Turn the turbine air to the gun on. Measure the voltage at the gun electrode with a voltage probe and meter.

6. Discharge the system voltage by waiting 30 seconds and then touching the gun electrode with a grounded rod.

7. If the meter reading is 45 to 55 kV, the gun and fluid hose are okay, and the problem is in the voltage isolation system. See the voltage isolation system manual for further troubleshooting information.

   If the reading is below 45 kV, the problem is in the gun or fluid hose.

8. Flush the fluid hose and gun with enough air to dry out the fluid passages.

9. Turn the turbine air to the gun on. Measure the voltage at the gun electrode with a voltage probe and meter.

10. If the meter reading is 55 to 60 kV, the gun power supply is okay, and there is probably a dielectric breakdown somewhere in the fluid hose or gun. Continue with step 11.

    If the reading is below 55 kV, do the electrical tests on page 33 to check the gun and power supply resistance. If those tests show the gun and power supply are okay, continue with step 11, page 28.

Troubleshooting

Voltage Loss Troubleshooting (continued)

11. A dielectric breakdown is most likely in one of the following three areas. Repair or replace the component that is failing.

    - Fluid hose

      Check for leakage or any bulges in the outer jacket, which may indicate a pin-hole leak through the Teflon® layer. Disconnect the fluid hose from the gun, and look for signs of fluid contamination on the outside of the Teflon portion of the fluid tube.

      Inspect the end of the hose connected to the voltage block. Look for cuts or nicks.

      Make sure the hose is properly stripped; see Fig. 12, page 15, for hose stripping dimensions. Restrip or replace the hose.

    - Fluid packings

      Remove the packing assembly from the gun as instructed on page 38, and look for signs of fluid leakage or any blackened areas, which would indicate arcing is occurring along the packing rod.

    - Fluid hose connection joint to the spray gun

      A breakdown at the fluid hose connection joint would be caused by fluid leaking past the o-ring seals on the end of the hose. Remove the hose at the gun connection and look for signs of fluid leakage along the Teflon tube.

12. Before reassembling the gun, clean and dry the gun fluid inlet tube (item 17 on page 50). Repack the inner spacer of the fluid packing rod with dielectric grease and reassemble the gun.

13. Reconnect the fluid hose as instructed on page 15.

14. Check the gun voltage with the voltage probe and meter before filling the gun with fluid.

Poor Electrostatic Wrap Troubleshooting

Problem	Cause	Solution
The system is holding voltage but there is poor electrostatic wrap on the part being sprayed	The distance between the gun and workpiece is incorrect.	Adjust the spraying distance to 8 to 12 inches (203 to 305 mm).
	The parts are poorly grounded.	Clean the workpiece hangers; check for proper grounding on the conveyor or track.
	Booth exhaust velocity is too high.	Reduce the exhaust velocity within the code limits.
	The atomizing air pressure is too high.	Reduce the atomizing air pressure.
	The fluid pressure is too high.	Reduce the fluid pressure.
	The fluid viscosity is not right for electrostatic spray.	Check with the supplier for proper fluid viscosity for electrostatic spray.

Troubleshooting

Electrical Troubleshooting

Problem	Cause	Solution
Voltage is still present at the gun after following the **Fluid Voltage Discharge and Grounding Procedure**	Gun electrostatics (turbine air) are not turned off.	Turn off the gun electrostatics.
	Did not wait long enough for the voltage to discharge through the voltage bleed resistor.	Wait a longer period of time before touching the electrode with a grounded rod. Check for possible bleed resistor failure.
	There is an air pocket in the fluid line that leaves the fluid near the gun isolated.	Determine the cause of the air pocket and fix the problem. Purge the air out of the fluid line.
	Voltage isolation system failed.	See the isolation system manual for service information.
The operator gets a shock	The operator is not properly grounded or is near an ungrounded object.	Be sure the floor and the operator are properly grounded; see **Ground the System**, page 17.
	The gun is not properly grounded.	See **Check the Electrical Grounding**, page 18.
The operator gets a shock when touching the workpiece	The workpiece is not properly grounded.	Clean the workpiece hangers; check for proper grounding on the conveyor or track
No or low voltage output reading on the gun ES (kV) display module	The fiber optic cable or connection is damaged.	Check the cables and connections; replace the parts if they are damaged.
	The turbine air is not on.	Turn on the turbine air.

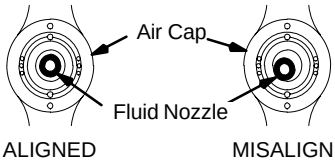
Troubleshooting

Gun Operation Troubleshooting

Problem	Cause	Solution
Fluid leakage from the fluid packing area	The fluid rod packings or fluid rod are worn.	Replace the packings or rod; see page 38.
Fluid leakage from the front of the gun	The fluid rod is worn or damaged.	Replace the fluid rod; see page 38.
	The fluid seat is worn.	Replace the fluid nozzle and/or electrode needle; see pages 36 to 37.
	The resistor stud is loose.	Tighten the resistor stud; see page 36.
	The fluid nozzle is loose.	Tighten the fluid nozzle; see page 36.
	The resistor stud o-ring is damaged.	Replace the o-ring; see page 36.
“Orange Peel” finish	The air pressure is insufficient for good atomization.	Increase the air cap air pressure by increasing the gun air inlet pressure; use the least air pressure needed for good results.
	The fluid is poorly mixed or filtered.	Remix or refilter the fluid.
	An improper thinner is being used.	Use the proper thinner.
Excessive spray fog	The air pressure is too high.	Reduce the air cap air pressure by decreasing the gun air inlet pressure; use the least air pressure needed for good results.
	The fluid is thinned too much.	Properly thin the fluid.
No fluid sprays from the gun	The fluid supply is low.	Check the fluid supply; add fluid if necessary.
	The fluid nozzle is dirty or clogged.	Clean the fluid nozzle; see page 24.
	The fluid nozzle is damaged.	Replace the fluid nozzle; see page 36.
	The piston is not actuating.	Check the cylinder air; check the piston u-cup; see page 39.
	The actuator arm is out of position.	Check the actuator arm and nuts; see page 39.
The equipment is covered with fluid	The exhaust air flow is insufficient or not directed properly.	Check for the proper CFM; check the baffles and direction of the air flow.
	The distance between the gun and workpiece is incorrect.	Adjust the spraying distance to 8 to 12 inches (203 to 305 mm).
Dirty air cap	The electrode is bent.	Straighten the electrode.
	The nozzle orifice is damaged.	Replace the fluid nozzle; see page 36.
	The fluid is coming on before the air.	Check the position of the actuator arm.

Troubleshooting

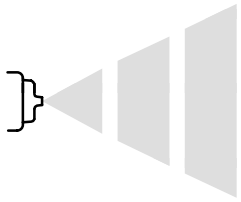
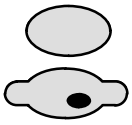
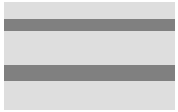
Gun Operation Troubleshooting (continued)

Problem	Cause	Solution
Dirty air cap	The air cap and fluid nozzle are misaligned.  	Check the air cap and fluid nozzle seat for fluid buildup. Clean or replace parts as needed; see page 24 or 36.
Air leakage from the air cap	The o-rings on the piston stem are worn.	Inspect the o-rings; replace them as needed; see page 39.
Air leakage from the manifold	The manifold gasket is damaged, or the manifold is not tight.	Replace the gasket or tighten the manifold screws; see page 44.
Fluid leakage at the quick-disconnect	The manifold is not tight.	Tighten the manifold screws.
	The fluid hose is not seated properly.	Make sure the hose was stripped and installed correctly; see page 15.
	The o-rings on the fluid hose are worn or missing.	Inspect or replace the o-rings.

Troubleshooting

Spray Pattern Troubleshooting

NOTE: Some spray pattern problems are caused by the improper balance between air and fluid.

Problem	Cause	Solution
Fluttering or spitting spray 	The fluid supply is insufficient.	Adjust the fluid regulator, or fill the fluid supply.
	The fluid nozzle is loose, or the fluid nozzle taper seat is damaged.	Tighten or replace the fluid nozzle; see page 36.
	There is dirt between the fluid nozzle, taper seat, and gun body.	Clean the parts; see page 24.
	The coupler at the fluid inlet is loose or cracked.	Tighten or repair the coupler.
	There is fluid build-up on the air cap; partially clogged horn holes; or full air pressure from the clean horn hole forces the fan pattern toward the clogged end.	Clean the air cap with a soft implement or submerge it in water and wipe it clean; see page 24.
	The electrode is bent.	Straighten the electrode.
	The fluid nozzle or air cap holes are damaged.	Replace the damaged part; see page 36.
	There is fluid buildup on the perimeter of the fluid nozzle orifice, or a partially clogged fluid nozzle orifice.	Remove the obstruction; never use wire or hard instruments; see page 24.
	The electrode is bent.	Straighten the electrode wire.
	The fan air pressure is too high.	Reduce the fan air pressure.
	The fluid is too thin.	Reduce the fluid viscosity.
	There is not enough fluid pressure.	Increase the fluid pressure.
	The fan air pressure is too low.	Increase the fan air pressure.
	The fluid is too thick.	Reduce the fluid viscosity.
	There is too much fluid.	Reduce the fluid flow.
Streaks 	The last coat of fluid is applied too wet.	Apply a drier finish using multiple strokes.
	There is too much air pressure.	Decrease the air pressure.
	The air pressure is insufficient.	Increase the air pressure.
	The spray pattern is non-uniform.	Clean or replace the air cap; see page 24.

Electrical Tests

⚠ WARNING

ELECTRIC SHOCK HAZARD
Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 before checking or servicing the system and whenever you are instructed to discharge the voltage to ensure the voltage is discharged and avoid serious injury from an electric shock.

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 before checking or servicing the system and whenever you are instructed to relieve the pressure.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
Megohmmeter P/N 241079 (L–see Fig. 22) is not approved for use in a hazardous area. To reduce the risk of sparking, do not use the megohmmeter to do electrical tests unless:

- The gun has been removed from the hazardous area;
- Or all spraying devices in the hazardous area are turned off, ventilation fans in the hazardous area are operating, and there are no flammable vapors in the area (such as open solvent containers or fumes from spraying).

Failure to follow this warning could cause fire, explosion, electric shock and result in serious injury and property damage.

The performance of the spray gun is directly affected by the condition of the electrical components contained inside the gun. The electrical tests can be used to determine the condition of the power supply and the resistor stud as well as the continuity of the electrical path between the components.

Use megohmmeter (L), part no. 241079, and an applied voltage of 500 volts to complete these electrical tests. Connect the leads as shown.

Remove the gun from the manifold and bracket, as instructed on page 35, before performing the electrical tests.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
To reduce the risk of sparking, which could cause fire, explosion, or electric shock and result in serious injury, do not use the megohmmeter in the hazardous area. Remove the gun from the hazardous area before testing it.

Test Gun Resistance

1. Prepare the gun for service as instructed on page 35.

2. Measure the resistance between the end of the electrode (13) and the gun body (29). See Fig. 22.

3. The resistance should be between 329 to 401 megohms. If the resistance is outside the specified range, measure the power supply and resistor stud resistance as instructed on page 34.

4. If you still have problems, refer to **Voltage Loss Troubleshooting**, page 26, for other possible causes of poor performance, or contact the nearest authorized service agency.

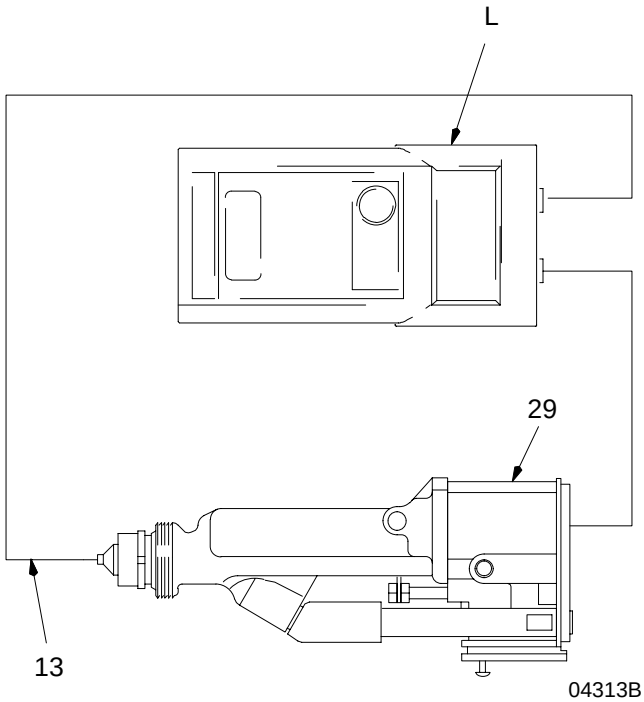


Fig. 22

Electrical Tests

Test Power Supply Resistance

1. Prepare the gun for service as instructed on page 35.

2. Remove the power supply (27) from the gun body (29) as instructed on page 42.

3. Remove the turbine alternator (25) from the power supply as instructed on page 43.

4. Measure the resistance from the power supply's ground contact point (R) to the contact inside of the power supply seal (D) *[the conductive rubber contact may be slightly recessed into the seal]*. See Fig. 23.

5. The resistance should be 297 to 363 megohms. If the resistance is outside the specified range, the power supply is defective and must be replaced. If the resistance of the power supply is correct, proceed to the next test.

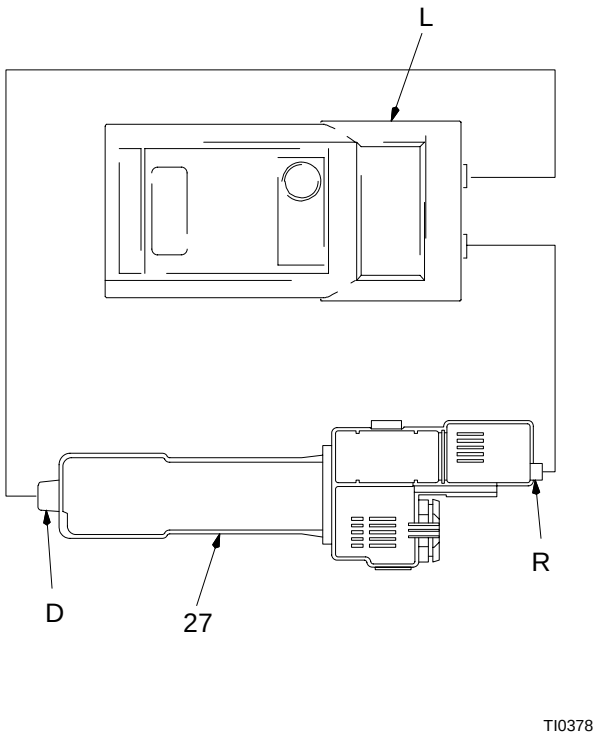


Fig. 23

Test Resistor Stud Resistance

1. Prepare the gun for service as instructed on page 35.

2. Remove the resistor stud (15) as instructed on page 36.

3. Check the resistance between the black resistor stud ring contact (S) and the needle contact ring (T). See Fig. 24. You may have to press down on the contact ring (S) in several places to get a good reading.

4. The resistance should be 21 to 29 megohms. If the resistance is correct, make sure the metal contact in the gun barrel and the needle contact ring (T) are clean. If the resistance is outside the specified range, the resistor is defective and the resistor stud (15) must be replaced. See page 36 to replace the resistor stud.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

The resistor stud contact ring (S) is a conductive contact ring, **not** a sealing o-ring. See Fig. 24. To reduce the risk of sparking, which could cause a sparking or electric shock, **do not** remove the resistor stud contact ring (S) or operate the gun without the contact ring in place. Do not replace the resistor stud (15) with anything but a genuine Graco part.

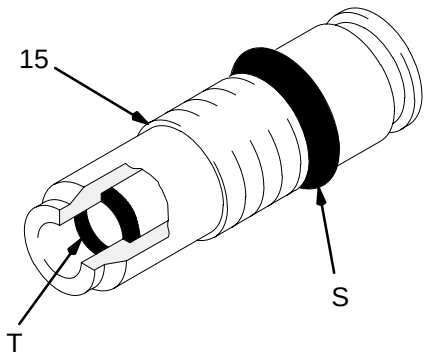


Fig. 24

Service

Tools Included with the Gun

- Ball End Wrench
- Multi-tool

Prepare the Gun for Service

NOTE:

- Check all the possible remedies in **Troubleshooting**, pages 26 to 32, before disassembling the gun.
- If the plastic parts of the gun must be held in a vise, use padded vise jaws to avoid damaging parts.
- Lightly lubricate o-rings and seals with petroleum jelly. Do not over-lubricate.
- Only use genuine Graco parts. Do not mix or use parts from other PRO Gun models.

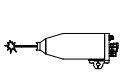
⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

To reduce the risk of a fire, explosion, or electric shock:

- Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 before flushing, checking, or servicing the system and whenever you are instructed to discharge the voltage.
- Clean all the parts with a non-flammable fluid as defined on the front cover of this manual.
- Do not service this equipment unless you are trained and qualified.
- Do not come within 2 ft. (610 mm) of the gun nozzle or gun-mounted fluid regulator during gun operation or until after following the **Fluid Voltage Discharge and Grounding Procedure**.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 before checking or servicing the system and whenever you are instructed to relieve the pressure.

1. Discharge the voltage as instructed on page 19.
2. Flush the gun with a non-flammable cleaning fluid.
3. Relieve the system pressure as instructed on page 19.

NOTE: The service area must be clean. Remove the gun from the worksite as instructed in the following steps.

4. Loosen the bottom gun screw (21). See Fig. 25.

⚠ CAUTION

The piston return spring (105) is compressed between the manifold (101) and gun body when they are assembled. To avoid sudden movement of the gun, loosen the bottom gun screw (21) before loosening the three manifold bolts (106). This allows the gun to move forward gradually as the manifold bolts are loosened. Hold the gun firmly in hand while loosening the manifold bolts.

5. Holding the gun (B) firmly in hand, loosen the three bolts (106) from the back of the manifold (101) with the ball end wrench (77–*not shown*).
6. Remove the gun (B) from the manifold (101), and take it to the service area.

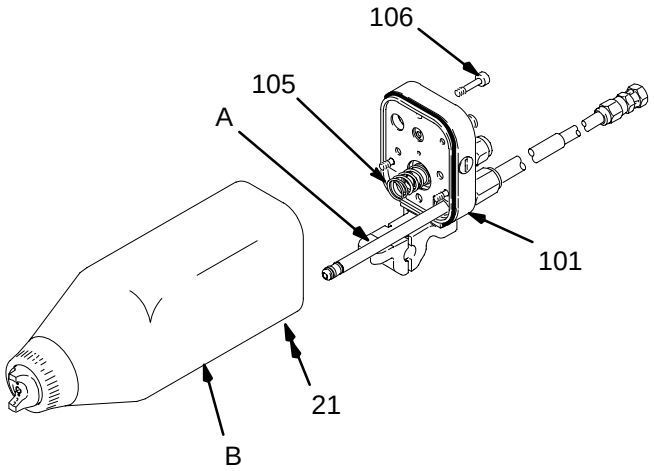


Fig. 25

Service

Air Cap/Nozzle/Resistor Stud Replacement

Removal

1. Prepare the gun for service as instructed on page 35.

2. Point the front end of the gun up while removing the air cap assembly (1, 3, 9, 12). See Fig. 26.

⚠ CAUTION

Hold the front end of the gun up while removing the nozzle and resistor stud to help drain the gun and prevent any fluid left in the gun from entering the air passages.

3. Remove the fluid nozzle (14) with the multi-tool (83).

   The resistor stud (15) should come out with the fluid nozzle. If the resistor stud remains in the gun, start the nozzle threads onto the resistor stud and pull it out.

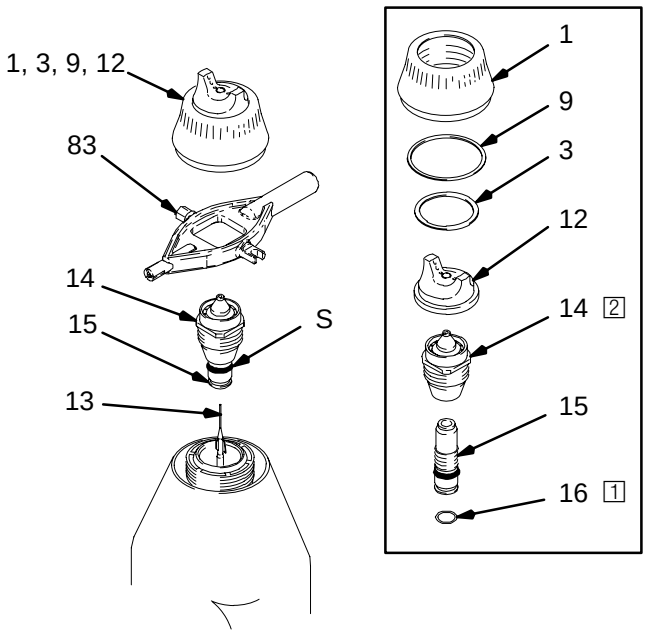
4. Unscrew the resistor stud (15) from the fluid nozzle (14) with the multi-tool (83). See Fig. 27.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

The resistor stud contact ring (S) is a conductive contact ring, **not** a sealing o-ring. See Fig. 26. To reduce the risk of sparking, which could cause a sparking or electric shock, **do not** remove the resistor stud contact ring (S) or operate the gun without the contact ring in place. Do not replace the resistor stud (15) with anything but a genuine Graco part.

[1] Apply a very light coat of lubricant to the o-ring (16).
[2] Tighten the nozzle (14) hand-tight, then 1/8 to 1/4 turn more.



03455A

Fig. 26

[1] Tighten the resistor stud (15) into the nozzle (14) to 10 in-lbs (1.13 N•m).

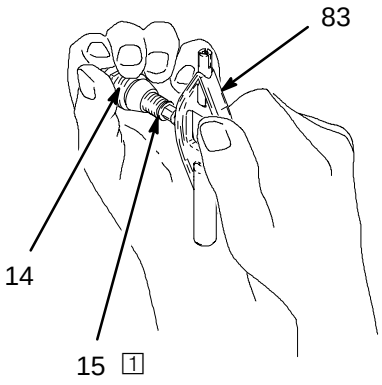


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Fig. 27

Air Cap/Nozzle/Resistor Stud Replacement (continued)

Installation

1. Lightly lubricate the o-ring (16) with petroleum jelly and install it on the resistor stud (15). See Fig. 26.

2. Make sure the electrode needle (13) is tightened properly. Refer to Fig. 28.

3. Install the resistor stud (15) in the fluid nozzle (14) with the multi-tool (83). Tighten the resistor stud to 10 in-lb (1.13 N•m). See Fig. 27.

4. Install the fluid nozzle (14) and resistor stud (15) assembly with the multi-tool (83). Tighten it until the fluid nozzle seats in the gun barrel (1/8 to 1/4 turn past hand-tight). See Fig. 26.

5. Carefully install the air cap (12) and gasket (3). Do not bend the electrode wire (13), and be sure to insert the electrode wire through the *center* air cap hole. Rotate the air cap horns to the desired position.

6. Make sure the o-ring (9) is in place on the air cap retaining nut (1). Tighten the retaining nut (1) until the air cap is held firmly in place; you should not be able to rotate the air cap horns by hand.

7. Test the gun resistance as instructed on page 33.

Electrode Needle Replacement

1. Prepare the gun for service as instructed on page 35.

2. Remove the air cap, nozzle and resistor stud as instructed on page 36.

3. Unscrew and remove the electrode needle (13) with the multi-tool (83). See Fig. 28. Be careful not to damage the contact wire. If the fluid rod turns, hold the back end of the fluid rod (C).

4. Apply low-strength *(purple)* Loctite® or equivalent thread sealant to the fluid rod threads.

   Hold the back end of the fluid rod (C) to prevent it from turning while installing the new electrode needle (13) finger-tight. Do not over-tighten the electrode needle.

⚠ CAUTION

To avoid damaging the plastic threads or contact wire, be very careful when installing the electrode needle.

5. Install the fluid nozzle, resistor stud, and air cap as described on page 36.

6. Test the gun resistance as instructed on page 33.

[1] Apply low-strength *(purple)* Loctite or equivalent to the fluid rod threads, then install the electrode needle (13).

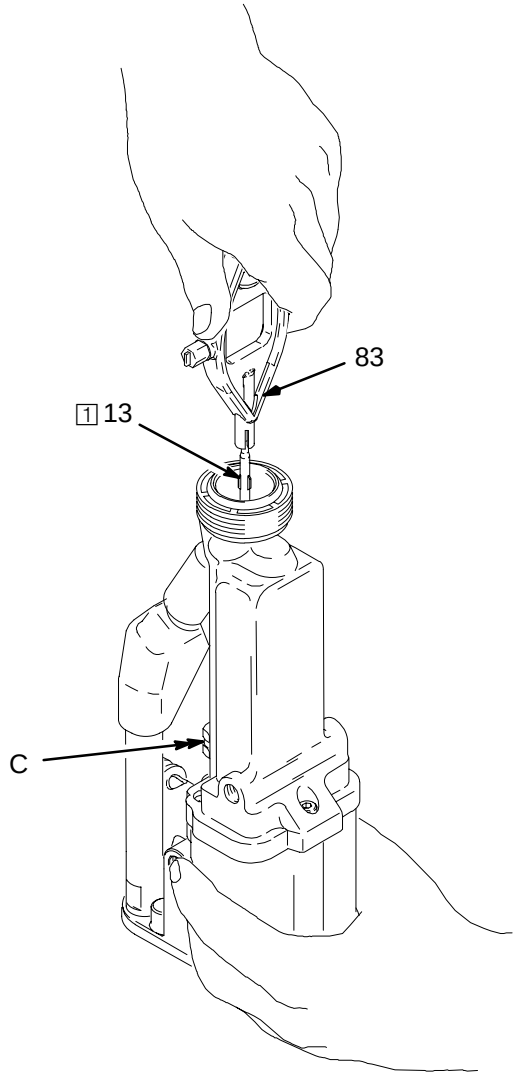


Fig. 28

Service

Fluid Packing Rod Removal and Repair

Preventative Maintenance

⚠ CAUTION

If the conductive fluid is allowed to leak through the packings, it will eventually cause an electrical short through the packings and along the gun barrel, resulting in a loss of voltage at the tip of the gun. Severe arcing can cause barrel damage. To avoid voltage loss and possible barrel damage, preventative maintenance of the fluid packing assembly must be performed at regular intervals.

Use the following formula to calculate the best packing service interval for your application:

$$\text{Service Interval in Days} = \frac{25{,}000}{T \times H}$$

Where T = trigger cycles per minute
and H = hours of operation per day

For example: If the trigger cycles per minute equals 10 and the hours of operation per day equals 8, the equation would be,

$$\frac{25{,}000}{10 \times 8} = \frac{25{,}000}{80} = 312.5$$

The service interval would be 312 work days.

Procedure

NOTE: The fluid packing rod can be replaced as individual parts or as an assembly. If the assembly is purchased, it is pre-adjusted at the factory.

1. Prepare the gun for service as instructed on page 35.

2. Remove the jam nut (46) and actuator arm (19). See Fig. 31, page 39.

3. Remove the air cap assembly, fluid nozzle and resistor stud and electrode needle as instructed on pages 36 and 37.

4. Remove the fluid packing rod assembly (28) with the multi-tool (83). See Fig. 29.

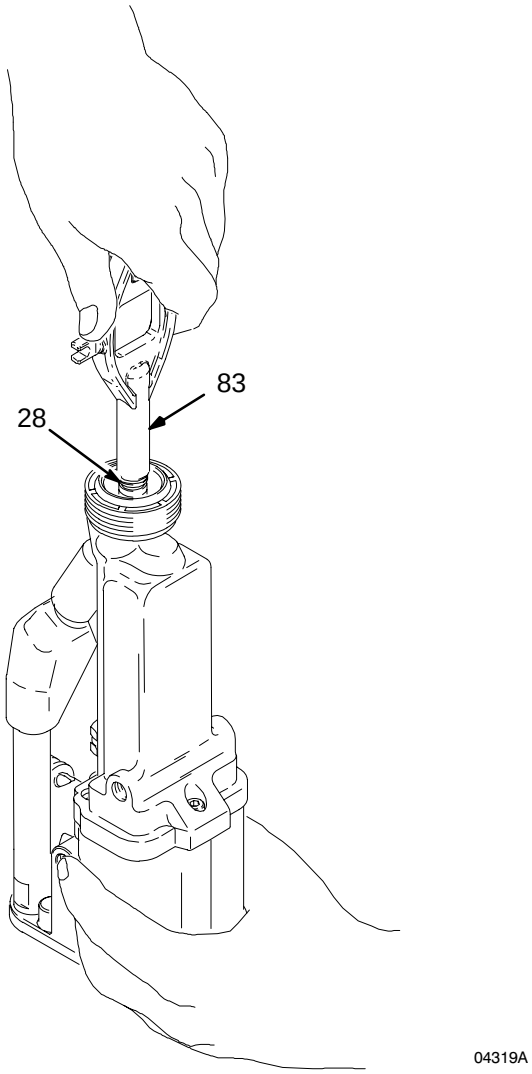


Fig. 29

5. Check all the parts for wear or damage and replace if necessary.

   Before installing the fluid packing rod assembly (28), clean the internal surfaces of the barrel with a soft brush or cloth. Check the inside of the barrel for marks from high voltage arcing. If the marks are present, replace the barrel.

6. *If the parts are purchased separately,* assemble them as instructed in steps 7 to 10 and as shown in Fig. 30, on page 39.

   If installing the complete fluid rod assembly, go to step 11, page 39.

Fluid Packing Rod Removal and Repair (continued)

7. Place the packing nut (28c) and o-ring (28g) on the fluid rod (28b). Flats on the packing nut must be facing toward the back of the fluid rod.

8. Fill the entire inner cavity of the spacer (28d) with the dielectric grease included with the gun. Place the spacer on the fluid rod (28b), in the direction shown in Fig. 30. Generously apply the grease to the outside of the spacer.

9. Place the fluid packing (28f), needle packing (28e), and housing (28a) on the fluid rod (28b), as shown in Fig. 30.

10. Lightly tighten the packing nut (28c) with the multi-tool (83). The packing nut is properly tightened when there is 2 lbs. (9 N) of drag force when sliding the packing housing (28a) assembly along the shaft. Tighten or loosen the packing nut as needed.

11. Lubricate the o-ring (28h) on the outside of the packing housing (28a).

12. Make sure the spring (11) is installed against the nut (U) as shown in Fig. 30.

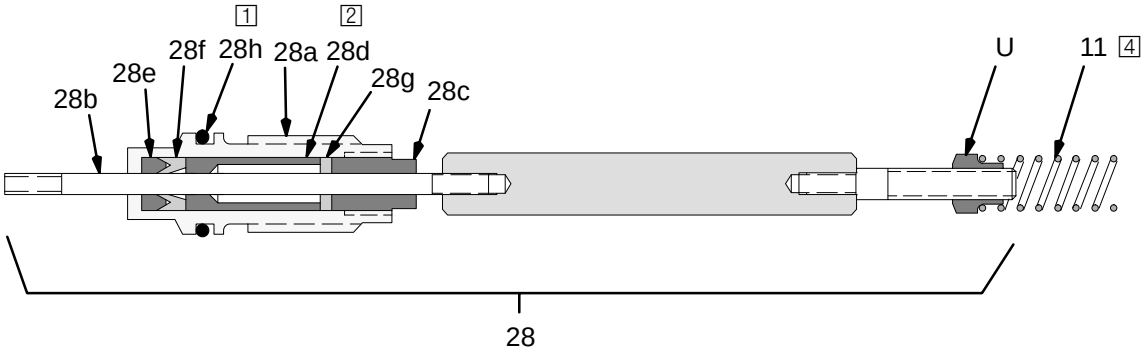
13. Install the fluid packing rod assembly (28) into the gun barrel. Using the multi-tool (83), tighten the assembly until just snug.

14. Install the electrode needle, nozzle and resistor stud assembly and the air cap assembly as instructed on page 37.

15. Install and adjust the actuator arm (19) and jam nut (46) as instructed on page 40.

16. Test the gun resistance as instructed on page 33.

[1] Apply a very light coat of lubricant to the o-ring (28h).
[2] Fill the inner spacer (28d) cavity with the dielectric grease and generously lubricate the outside of the spacer.
[3] Tighten the packing nut (28c) to 2 lbs (9 N) of drag force.
[4] The spring (11) is not included with the fluid packing rod assembly (28).



03224

Fig. 30

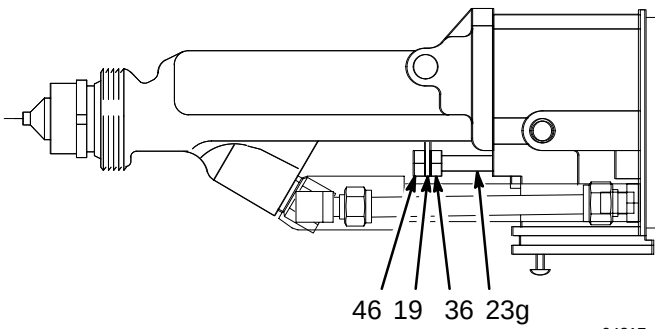
Piston Repair

1. Prepare the gun for service as instructed on page 35.

2. Remove the air cap assembly and the gun shroud.

3. Remove the jam nut (46), actuator arm (19), and adjustment nut (36). See Fig. 31.

NOTE: The fluid nozzle must be in place when removing or installing the jam nut and actuator arm.



04317

Fig. 31

Piston Repair (continued)

4. Push on the piston rod (23g) to push the piston assembly out the back of the gun.

5. Inspect the o-rings (23a, 23b, 23c) and u-cup packing (23f) for damage. See Fig. 33. Refer to Fig. 34 to isolate air leakage problems.

6. Lubricate the o-rings (23a, 23b, 23c) and u-cup packing (23f) with petroleum jelly.

7. Align the two stems (23d) with the holes in the gun body and press the piston assembly into the back of the gun until it bottoms.

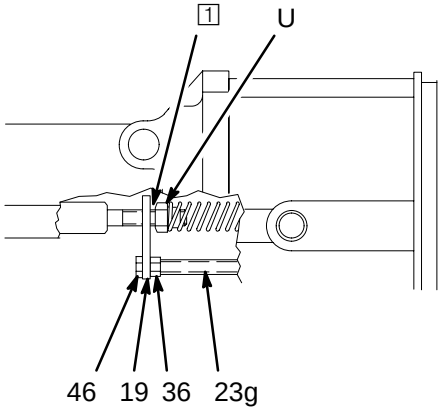
8. **Installing the Actuator Arm and Nuts:**

   a. Install the adjustment nut (36), actuator arm (19), and jam nut (46) onto the piston rod (23g). See Fig. 32.

NOTE: The jam nut (46) has a slightly larger hex and a thinner profile than the adjustment nut (36).

   b. Thread the jam nut (46) flush with the end of the piston rod (23g).Tighten the adjustment nut (36) against the actuator arm (19). When properly assembled, there should be about a 0.125 in. (3 mm) gap between the actuator arm (19) and the fluid packing rod nut (U), which allows the atomizing air to actuate before the fluid actuates. See Fig. 32. In addition, there should be 3 to 4 mm of electrode needle travel when the gun is triggered. If necessary, adjust the jam nut (46) position to obtain these dimensions.

[1] There should be a 0.125 in. (3 mm) gap between the actuator arm (19) and the fluid packing rod nut (U).



04823

Fig. 32

[1] Apply a very light coat of lubricant to the o-rings (23a, 23b, 23c) and u-cup (23f).

[2] Align the two stems (23d) with the holes in the gun body and press the piston assembly until it bottoms.

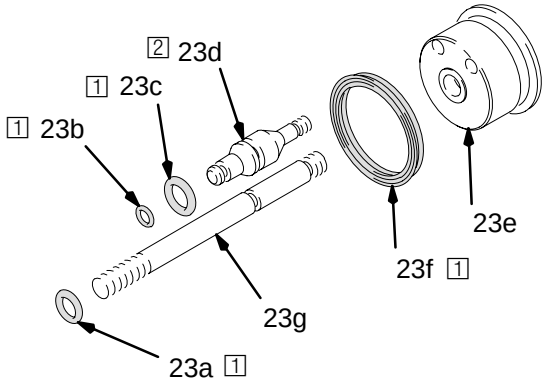


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Fig. 33

Description	Function
O-Ring (23a) Shaft Air Seal	It seals the cylinder air along the piston rod. If the air leaks along the piston rod (23g), replace this o-ring (23a).
O-Ring (23b) Front Air Seal	It is the air shut-off seal. If the air leaks from the air cap when the gun is detriggered, replace these o-rings.
O-Ring (23c) Back Air Seal	It separates the cylinder air pressure from the fan and atomizing air pressure.
U-cup (23f) Cylinder Air Seal	If the air leaks from the small vent hole in the back of the manifold when the gun is triggered, replace the u-cup.

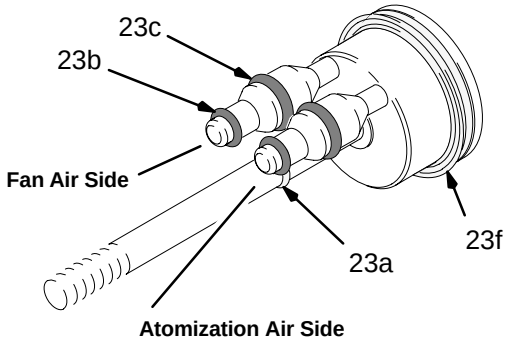

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Fig. 34

Service

Barrel Removal

1. Prepare the gun for service as instructed on page 35.

2. Remove the air cap assembly (A) and the shroud (2). See Fig. 35.

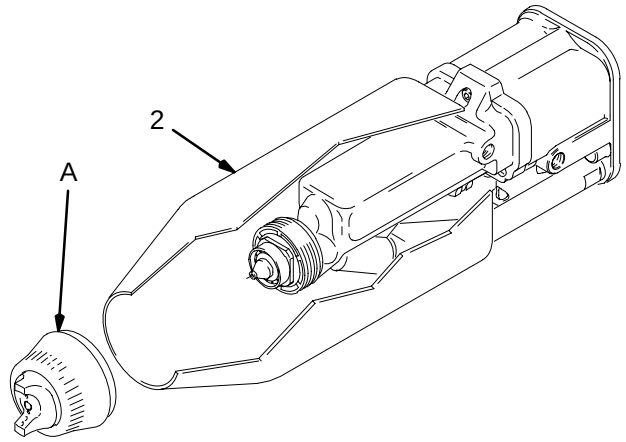
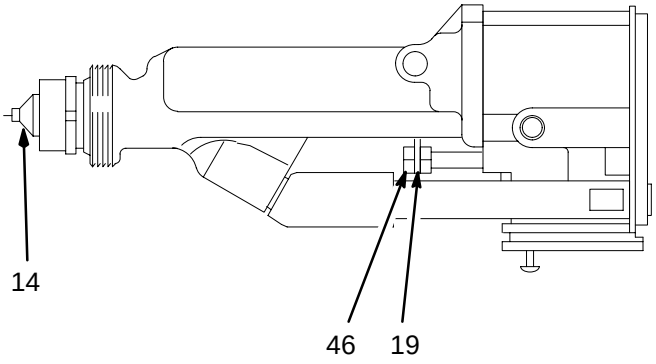


Fig. 35

3. Remove the jam nut (46) and actuator arm (19). See Fig. 36.

NOTE: The fluid nozzle (14) must be in place when removing or installing the jam nut and actuator arm.



04317

Fig. 36

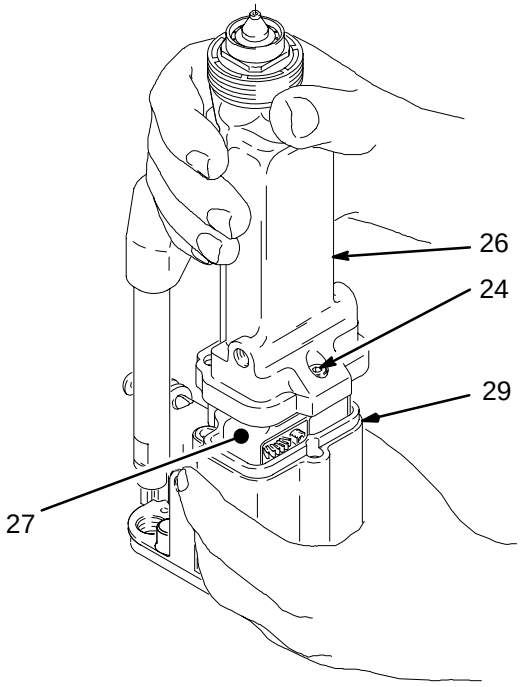
4. **Part No. 238091 Spray Gun:** Disconnect the air pilot line from the fluid regulator fitting.

5. Loosen the three screws (24) with the ball end wrench (77–*not shown*). See Fig. 37.

6. Hold the gun body (29) with one hand and pull the barrel (26) straight away from the body to remove it.

⚠ CAUTION

To avoid damaging the power supply (27), pull the gun barrel straight away from the gun body. If necessary, gently move the barrel from side to side to free the power supply from the gun body.



04316

Fig. 37

Service

Power Supply Removal and Replacement

NOTES:

- To avoid a loss in electrostatic performance, inspect the gun body power supply cavity for dirt or moisture. Clean the cavity with a clean, dry rag.
- Do not expose the seal (D) or gasket (27a) to solvents as it will damage the parts.

1. Prepare the gun for service as instructed on page 35.
2. Remove the barrel as instructed on page 41.
3. Grasp the power supply (27) with your hand. With a gentle side-to-side motion, being careful not to damage the power supply, pull the power supply free from the gun body (29), then pull it straight out. See Fig. 38.
4. Inspect the power supply for any physical damage. Check the electrical resistance as instructed in **Test Power Supply Resistance**, page 34. If necessary, replace the power supply.
5. Before installing the power supply, inspect the seal (D) for any damage or swelling. Replace the seal if necessary. Make sure the gaskets and pads (27a–27f) are in place.
6. Lubricate the o-ring (25a), and install the power supply (27) in the gun body (29).
7. Install the barrel on the gun body as instructed on page 44.

[1] Apply a very light coat of lubricant to the o-ring (25a).
[2] Do not expose the seal (D) or gasket (27a) to solvents.

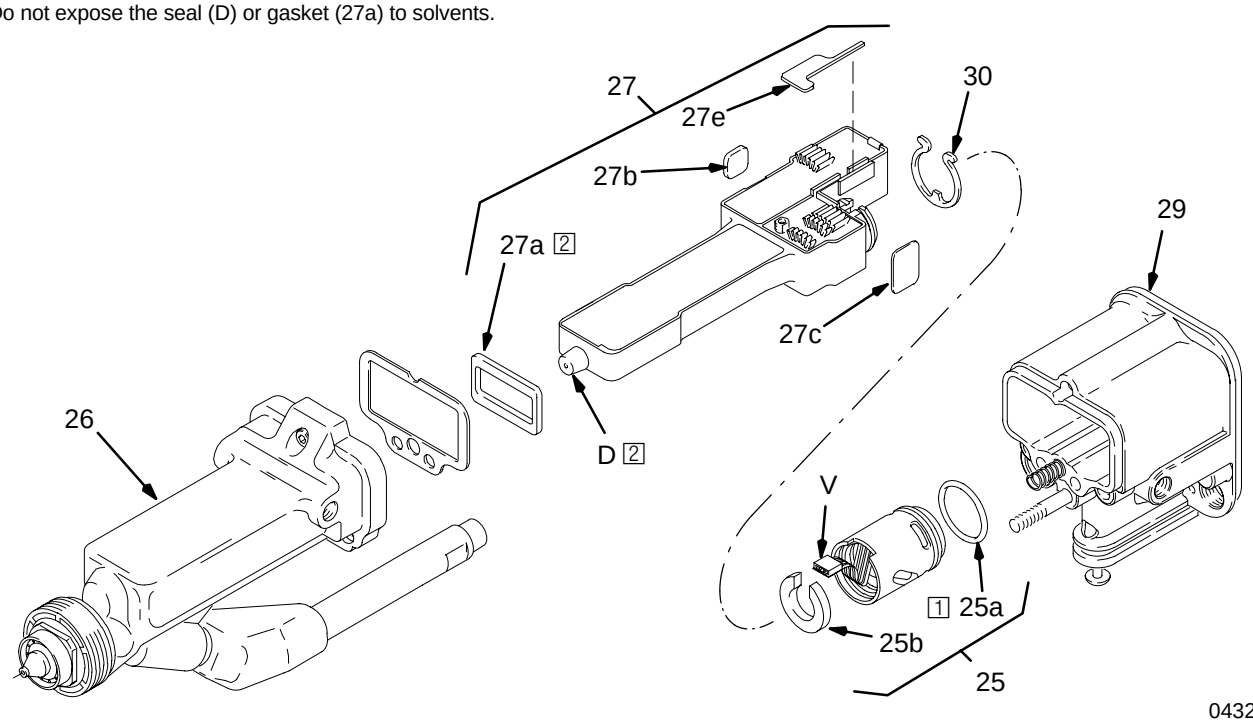


Fig. 38

Turbine Alternator Removal and Replacement

NOTE: Replace turbine bearings after 2,000 hours of operation. See your authorized Graco representative.

1. Prepare the gun for service as instructed on page 35.

2. Remove the barrel as instructed on page 41.

3. Remove the power supply as instructed on page 42.

4. Squeeze the two ends of the retaining ring (30) together, and carefully pull the alternator (25) away from the power supply (27) until the wire connector (V) disengages. See Fig. 38, page 42.

5. Use an ohmmeter to test the turbine alternator coil. Measure the resistance between the two outer terminals of the 3-wire connector (V). Resistance should be 3 to 5 ohms. If the reading varies from this value, replace the alternator.

6. Measure the resistance between each outer terminal of the 3-wire connector (V) and the alternator (25) housing. The resistance should be infinite. If the resistance is not infinite, replace the alternator.

7. Connect the 3-wire connector to the 3 prongs in the power supply. Push the alternator (25) onto the power supply (27) until the retaining ring (30) engages with the alternator.

8. Install the power supply in the gun body as instructed on page 42.

9. Install the barrel on the gun body as instructed on page 44.

Service

Barrel Installation

1. Be sure the gaskets (20, 27a) and spring (11) are in place. See Fig. 39. Replace the parts if they are damaged.

2. Place the barrel (26) over the power supply (27) and onto the gun body (29). Make sure the fluid needle spring (11) is seated properly.

3. Install the fluid tube (17) into the gun body (29).

4. Using the ball end wrench (77–*not shown*), tighten the three screws (24) oppositely and evenly to 18 in-lbs (2 N•m) maximum (about a half turn past snug); do not over-tighten the screw.

⚠ CAUTION

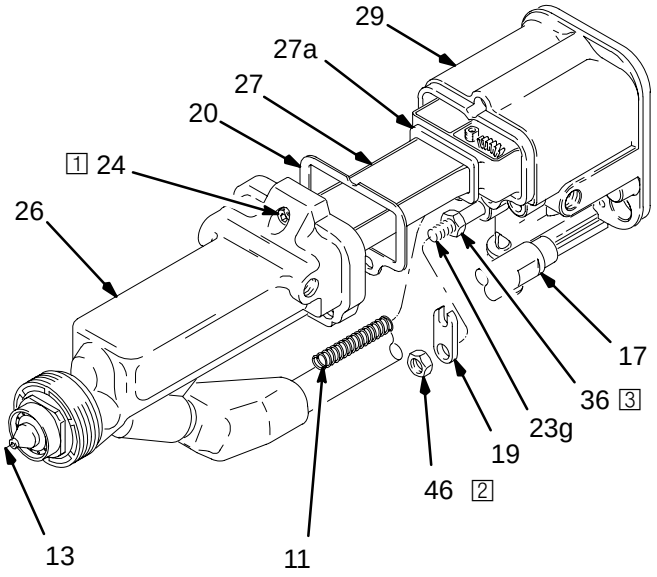
To avoid damaging the gun, **do not** over-tighten the screws (24).

5. Install and adjust the actuator arm (19) and jam nut (46) as instructed on page 40.

6. Test the gun resistance as instructed on page 33.

7. **Part No. 238091 Spray Gun:** Connect the air pilot line to the fluid regulator fitting.

[1] Tighten the screws (24) to 18 in-lbs (2 N•m) maximum (about half turn past snug), using the wrench (77) provided.
[2] Install the nut (46) flush to the end of the piston rod (23g).



04318

Fig. 39

Install the Gun onto the Manifold

1. Make sure the gaskets (121, 108) and the spring (105) are on the manifold (101). See Fig. 41, page 45. Inspect the parts for damage and replace as needed.

2. Make sure the fluid hose Teflon® tube (A), which inserts into the gun, and the gun fluid tube (17) opening are clean.

   If the parts are dirty, clean them and apply a light coat of the dielectric grease to the entire length of the Teflon tube (A). Keep the fluid tubes free of contaminants during assembly.

⚠ CAUTION

If the Teflon tube (A) or the gun fluid tube (17) become contaminated, a conductive path may be created, which may short out the gun. Keep these parts free of contaminants.

3. Inspect the condition of the o-rings (C) on the fluid hose barbed-fitting. See Fig. 40, page 45. Replace the o-rings if they are worn or damaged.

4. Align the gun (B) and slide it onto the Teflon tube (17) until the gun meets the manifold (101). See Fig. 41.

5. Secure the gun (B) to the manifold (101) by tightening the three screws (106) with the ball end wrench (77–*not shown*).

6. Secure the gun (B) to the mounting bracket (102) by tightening the screw (21) with the ball end wrench (77).

Install the Gun onto the Manifold (continued)

7. To ensure the o-rings (C) on the barbed-fitting are seated in the gun, loosen the nut (D) and push the fluid hose into the gun until the barbed-fitting bottoms out. See Fig. 40.

⚠ WARNING

ELECTRIC SHOCK HAZARD
To maintain grounding continuity, the conductive hose layer (E) must be engaged in the fitting (P1) when the nut (D) is tightened. See Fig. 40. Failure to properly install the hose into the fitting could result in an electric shock.

8. Tighten the nut (D) firmly with a wrench to about 55 in-lb (6.2 N•m). Pull back on the hose to make sure it is secure.

⚠ CAUTION

If the hose comes loose from the fitting (P1), fluid leakage will occur. Make sure the nut (D) is tight and that nothing will pull or catch on the hose during operation.

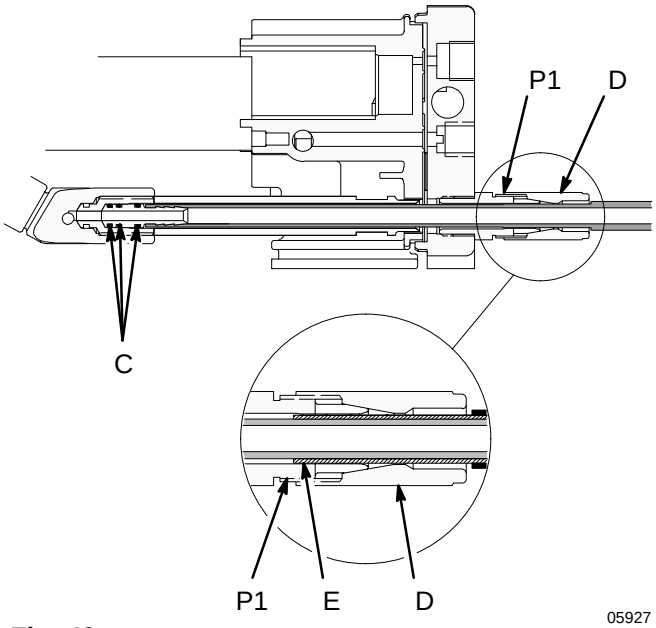


Fig. 40

9. Slide the shroud (2) onto the gun (B). See Fig. 41.

10. Carefully install the air cap (12) and gasket (3–*not shown*). Do not bend the electrode (13), and be sure to insert the electrode wire through the *center* air cap hole. Rotate the air cap horns to the desired position.

11. Make sure the o-ring (9) is in place on the air cap retaining nut (1). Tighten the retaining nut until the air cap (12) is held firmly in place; you should not be able to rotate the air cap horns by hand.

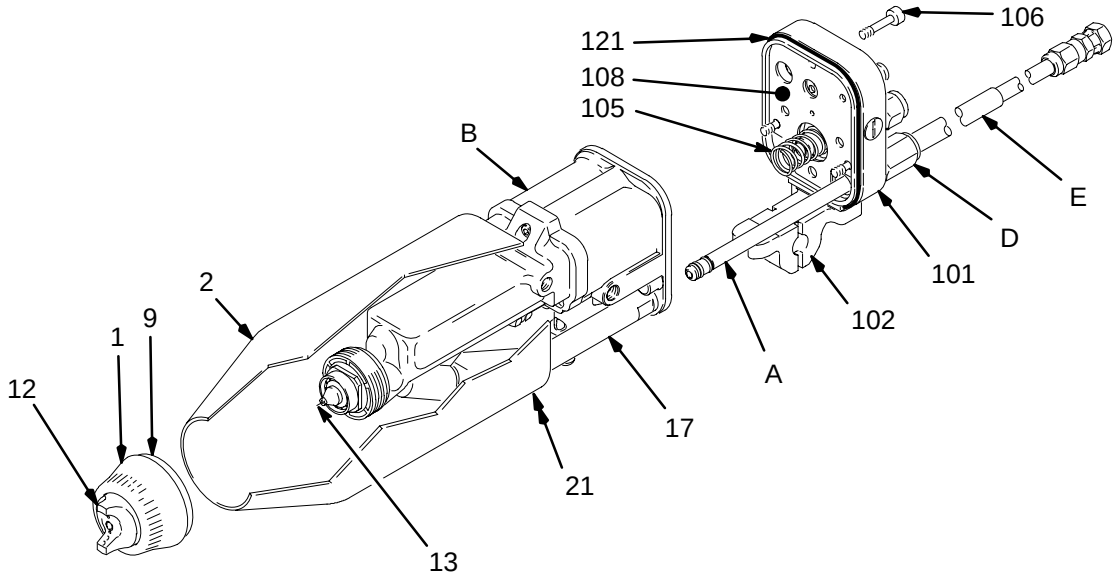


Fig. 41

Service

Part No. 238039 Fluid Regulator Repair

NOTE: The fluid regulator is item 17 in the parts list for the part no. 238091 spray gun. It is not included with part no. 237603 and 236824 spray guns. A Conversion Kit is available to add the fluid regulator to those spray guns. See page 47.

1. Prepare the gun for service as instructed on page 35.
2. Remove the barrel as instructed on page 41.
3. Remove the regulator assembly from the gun barrel by loosening the outlet fitting (B) from the gun barrel (C) and disconnecting the air tubing (90) from the elbow fitting (E). Refer to Fig. 43.
4. Disassemble the regulator parts as shown in Fig. 42.

[1] Make sure the seat (408) is aligned with the regulator body (401) threads to avoid cross-threading.

[2] Teflon side of diaphragm (413) faces up, toward body (401).

[3] Tighten the cover (402) firmly

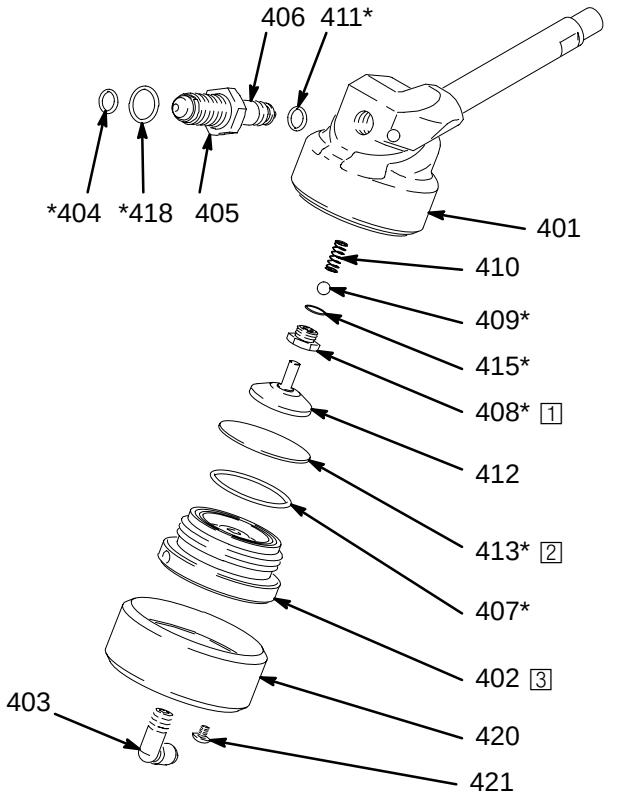


Fig. 42

5. Replace the o-rings, seat, ball bearing, and diaphragm with the parts included in the Regulator Repair Kit, part no. 238148.
6. Be sure all the parts are clean and dry, then re-assemble the regulator.
7. Screw the regulator outlet fitting (B) into the gun barrel (C), and tighten the fitting securely. Connect the air tubing (90) to the elbow fitting (E). Refer to Fig. 43.
8. Install the barrel on the gun body as instructed on page 44.
9. Install the gun onto the manifold as instructed on page 44.

Fluid Regulator Parts List

Includes items 401 to 418

Ref. No.	Part No.	Description	Qty.
401	238037	BODY ASSY.	1
402	190868	COVER	1
403	109193	ELBOW, tube fitting	1
404*	111316	O-RING, fluoroelastomer	1
405	190872	OUTLET FITTING	1
406	190871	OUTLET STEM	1
407*	110497	O-RING, Viton®	1
408*	188944	SEAT	1
409*	102922	BALL BEARING	1
410	112204	SPRING, compression	1
411*	111450	O-RING, CV–75	1
412	238215	ACTUATOR	1
413*	187168	DIAPHRAGM	1
415*	107505	O-RING, Teflon®	1
418*	102982	O-RING, Teflon	1
420	191406	COVER	1
421	113522	SCREW, 1/4–20	4

* *These parts are included in Repair Kit 238148, which may be purchased separately.*

Part No. 238147 Fluid Regulator Conversion Kit Installation

To add a fluid regulator to part no. 237603 and 236824 PRO 5500wb spray guns, follow this procedure:

1. Prepare the gun for service as instructed on page 35.
2. Remove the barrel as instructed on page 41.
3. Remove the fluid fitting (17) and o-rings (18, 22) from the gun barrel. Refer to page 50.
4. Make sure the o-ring (A) is in place on the regulator outlet fitting (B). See Fig. 43.
5. Screw the regulator outlet fitting (B) into the gun barrel (C), and tighten the fitting securely.
6. Apply high strength *(green)* Loctite® or equivalent. to the adapter (88) threads, and install the adapter into the gun body (D).
7. Install the tube fitting (89) into the adapter (88).
8. Install the barrel on the gun body as instructed on page 44.
9. Install the air tubing (90) between the regulator elbow fitting (E) and the tube fitting (89). Cut the tubing to the length needed.
10. Install the gun onto the manifold as instructed on page 44.

NOTE: Use the parts drawing and list on pages 52 and 53 to order replacement parts for your gun after adding the fluid regulator.

Conversion Kit Parts List

Includes items 2, 17, 88, 89, and 90

Ref. No.	Part No.	Description	Qty.
2**	190905	SHROUD	1
17	238039	FLUID REGULATOR	1
88	190899	ADAPTER	1
89	111328	TUBE FITTING	1
90	054730	AIR TUBING; 5/32 O.D.	†

** *Order the warning label 290069, at no cost, when ordering the shroud. Affix the label to the shroud.*

† *1 ft. (305 mm) of tubing included with kit. To replace tubing, order the length needed.*

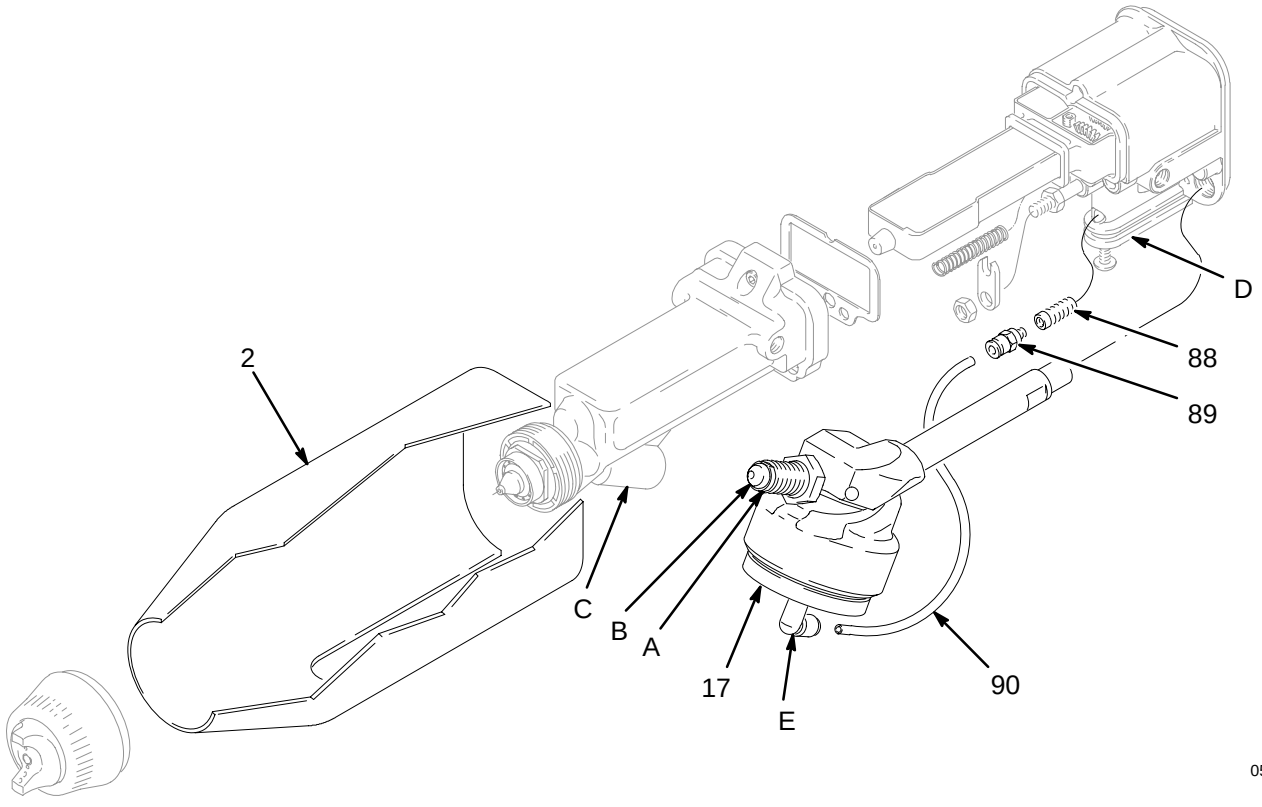


Fig. 43

Service

Graco Waterborne Fluid Hose Repair

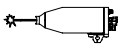
⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

To reduce the risk of a fire, explosion, or electric shock:

- Follow the **Fluid Voltage Discharge and Grounding Procedure** on page 19 before flushing, checking, or servicing the system and whenever you are instructed to discharge the voltage.
- Clean all the parts with a non-flammable fluid as defined on the front cover of this manual.
- Do not service this equipment unless you are trained and qualified.
- Do not come within 2 ft. (610 mm) of the gun nozzle or gun-mounted fluid regulator during gun operation or until after following the **Fluid Voltage Discharge and Grounding Procedure**.

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of an injury, follow the **Pressure Relief Procedure** on page 19 before checking or servicing the system and whenever you are instructed to relieve the pressure.

Damaged hoses or hoses that have a “pin-hole” dielectric failure, close to the end of the hose, can be repaired by cutting away the failed portion and restripping the hoses to the dimensions shown in Fig. 44.

1. Discharge the voltage as instructed on page 19.
2. Relieve the system pressure as instructed on page 19.
3. Disconnect the fluid hose from the gun and voltage isolation system.
4. Cut off the damaged end of the hose. If the hose has a pin-hole failure, strip back the outer hose jacket (H) and the conductive layer (J) about 12 inches (105 mm) on each hose end. Look for the failure point, which will be a very small pin-hole, discolored due to arcing. Continue stripping back the hose until the failure point is found.
5. Carefully cut through the outer hose jacket (H) and peel it back about 12 inches (105 mm). **Do not** cut into the conductive layer (J) of the hose.
6. Cut through the first 1/2 inch (12.7 mm) of the conductive hose layer (J) to create an edge to hold onto. Peel back the conductive hose layer by unwrapping it in a spiral pattern. Cut it off at the dimension shown in Fig. 44.
7. Cut off the inner hose layer (K) to the dimension shown in Fig. 44.
8. Inspect the hose for any nicks or cuts. Any nicks or cuts into the inner hose layer (K) will weaken the dielectric strength of the hose and shorten the service life. Repeat the above procedure if any damage is found.
9. Install a new barbed fitting by applying red dielectric grease to the outside of the barbs, and pressing the fitting into the gun end of the hose. Refer to the drawing of the Waterborne Fluid Hose Assembly on page 56.
10. Install the three o-rings on the barbed fitting.
11. Connect the fluid hose to the gun as instructed on page 15.

Measurements, inches (mm)			
A*	**B***	**C**	**D**
7.75 ± 0.1 (197 ± 2.5)	9.375 ± 0.1 (238 ± 2.5)	5.1 ± 0.1 (130 ± 2.5)	6.85 ± 0.1 (174 ± 2.5)

* The measurements specified are for use with the Graco H^2O PRO Voltage Block isolation system.

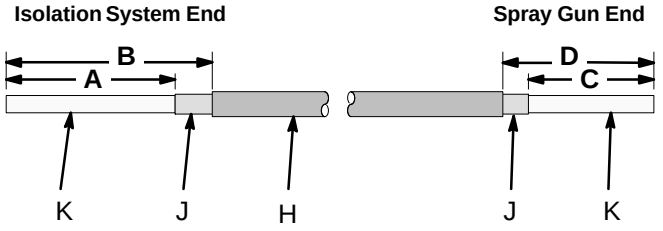
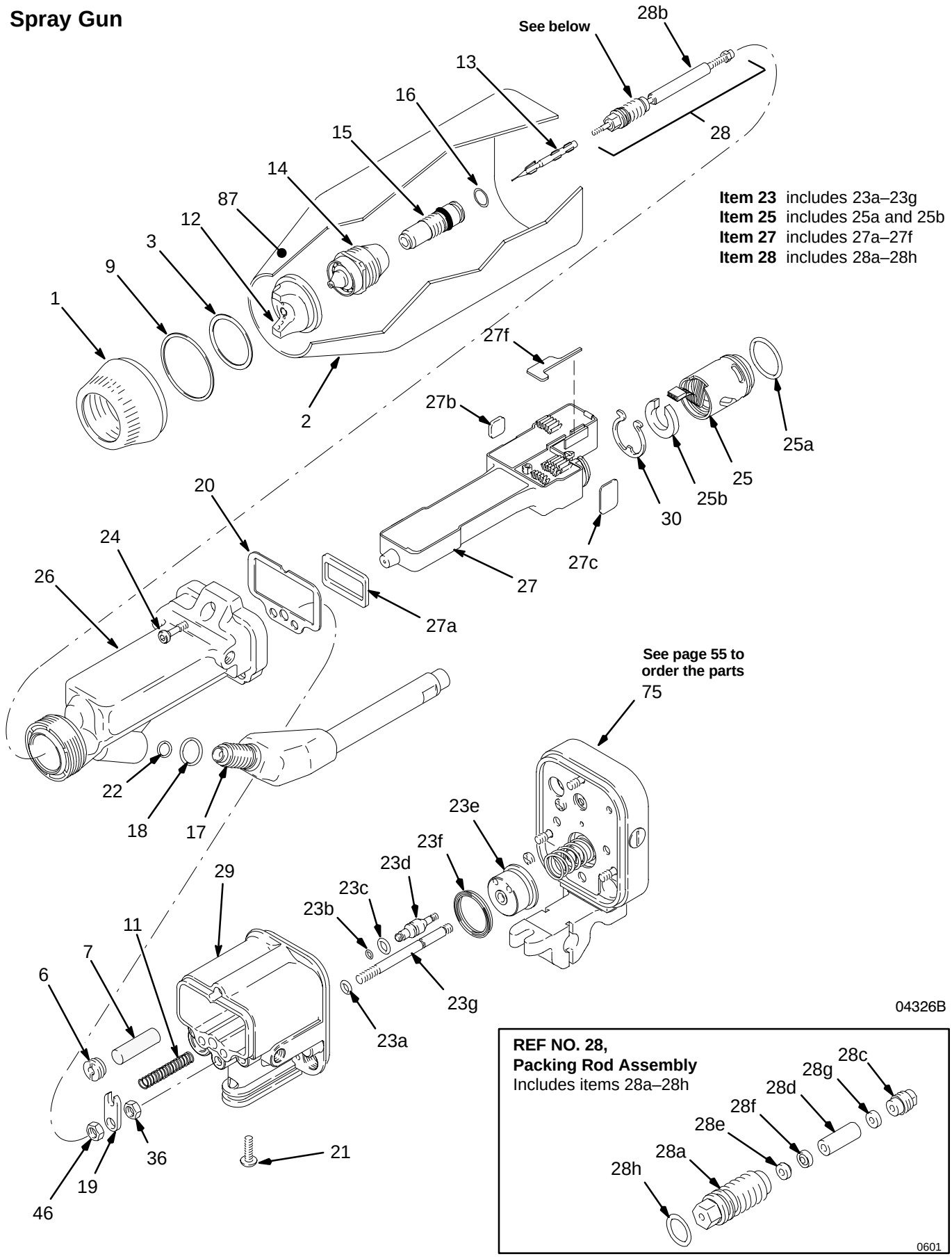


Fig. 44 05495

Notes

Spray Gun Parts

Part No. 237603 and 236824
Spray Gun



Item 23 includes 23a–23g
Item 25 includes 25a and 25b
Item 27 includes 27a–27f
Item 28 includes 28a–28h

REF NO. 28,
Packing Rod Assembly
Includes items 28a–28h

Spray Gun Parts

⚠ WARNING

EQUIPMENT MISUSE HAZARD
Use only genuine Graco replacement parts. Using non-Graco parts could alter the gun's grounding continuity or cause parts to rupture or fail, which could result in a serious injury and property damage.

Part No. 237603 Spray Gun

Includes items 1 to 87

Part No. 236824 Spray Gun

Includes items 1 to 46, 76–87

Ref. No.	Part No.	Description	Qty.
1	189768	RETAINING RING, air cap	1
2**	189770	SHROUD	1
3†	189786	GASKET, air cap nut	1
6	189367	CAP, exhaust	1
7	185122	MUFFLER/FLAME ARRESTOR	1
9†	110492	O-RING, Teflon®	1
11	185111	SPRING, compression	1
12	193033	AIR CAP; See Manual 307803 for other air caps	1
13	186615	NEEDLE, electrode	1
14	191834	NOZZLE, fluid See Manual 307803 for other nozzles	1
15	223977	STUD, resistor	1
16*	111507	O-RING, fluoroelastomer	1
17	237506	FITTING, fluid	1
18*	102982	O-RING; Teflon	1
19	186766	ARM, actuator	1
20†	185113	GASKET, manifold; polyethylene	1
21	112689	SCREW, socket; 1/4 x 0.75"	1
22*	111316	O-RING, fluoroelastomer	1
23	236826	PISTON ASSY.; Includes items 23a–23g	1
23a†	111508	• O-RING; fluoroelastomer	1
23b†	111504	• O-RING; fluoroelastomer	2
23c†	112319	• O-RING; fluoroelastomer	2
23d	189355	• STEM, piston	2
23e	189747	• PISTON	1
23f†	189752	• PACKING, u-cup; ultra high molecular weight polyethylene	1
23g	189754	• ROD, piston	1
24	185096	SCREW, cap, relieved; M5 x 0.8	3
25	222319	ALTERNATOR, turbine Includes items 25a and 25b	1
25a†	110073	• O-RING, Viton®	1
25b	185124	• CUSHION	1
26	223940	BARREL, gun	1
27	237250	POWER SUPPLY ASSY.; 60 kV Includes items 27a–27f	1
27a	186840	• GASKET	1
27b	185099	• PAD	1
27c	185145	• PAD	2
27f	192361	• PAD	1
28	224747	PACKING ROD ASSY. Includes items 28a–28h	1
28a	185495	• HOUSING, packing	1
28b	223981	• ROD, fluid	1
28c	185488	• NUT, packing	1
28d*	186069	• SPACER, packing	1
28e	178763	• PACKING, rod	1
28f*	178409	• PACKING, fluid	1
28g*	111504	• O-RING, fluoroelastomer	1
28h*	111316	• O-RING, fluoroelastomer	1
29	190055	BODY, gun	1
30	185114	RETAINER RING, alternator	1
31	112638	FITTING, fiber optic *(shown on page 54)*	1
36	102025	NUT, hex; 1/4"–20	1
46	101324	NUT, hex jam; 1/4"–20	1
75	237553	MANIFOLD ASSY.; *237603 only*; See separate parts list on page 55	1
77☞	107460	WRENCH, ball end	1
78☞▲	186118	SIGN, warning, spray area, English	1
80☞	217115	GREASE, dielectric, tube	1
83☞	191744	MULTI-TOOL	1
84☞▲	179791	TAG, warning	1
85☞	189888	COVER, gun	1
86☞▲	290171	SIGN, warning English	1
87▲	290069	LABEL, warning	1

* *These parts are included in Fluid Seal Repair Kit 237765, which may be purchased separately. This kit also includes the fluid hose o-rings; refer to page 56.*

† *These parts are included in Air Seal Repair Kit 236827, which may be purchased separately.*

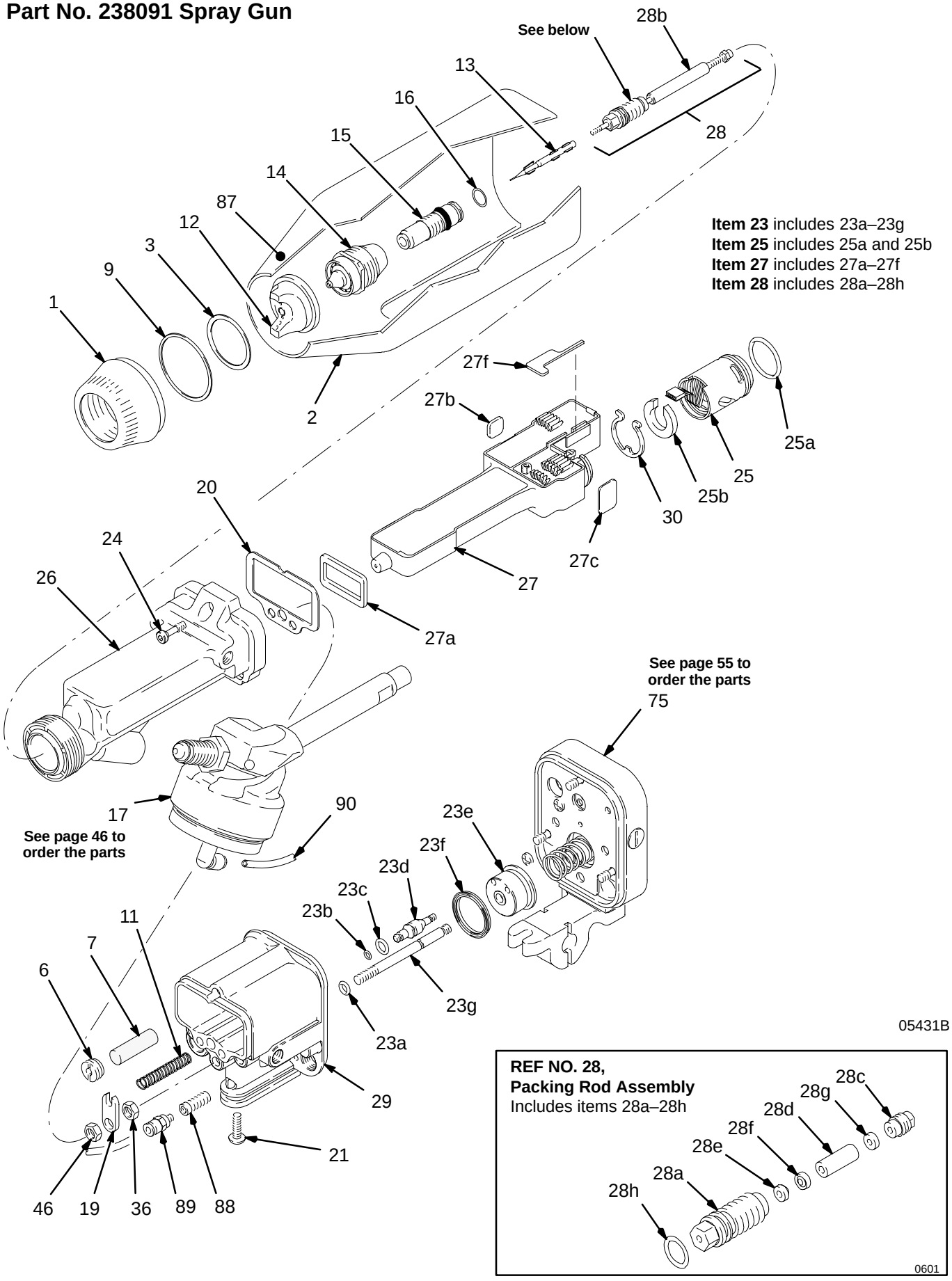
** *Order the warning label 290069 (item 87), at no cost, when ordering the shroud. Affix the label to the shroud.*

☞ *These parts are not shown in the parts drawing.*

▲ *Replacement Warning labels, tags, and signs are available at no cost.*

Spray Gun Parts

Part No. 238091 Spray Gun



Spray Gun Parts

⚠ WARNING

EQUIPMENT MISUSE HAZARD
Use only genuine Graco replacement parts. Using non-Graco parts could alter the gun's grounding continuity or cause parts to rupture or fail, which could result in a serious injury and property damage.

Part No. 238091 Spray Gun

Includes items 1 to 90

Ref. No.	Part No.	Description	Qty.
1	189768	RETAINING RING, air cap	1
2**	190905	SHROUD	1
3†	189786	GASKET, air cap nut	1
6	189367	CAP, exhaust	1
7	185122	MUFFLER/FLAME ARRESTOR	1
9†	110492	O-RING, Teflon®	1
11	185111	SPRING, compression	1
12	193033	AIR CAP; See Manual 307803 for other air caps	1
13	186615	NEEDLE, electrode	1
14	191832	NOZZLE, fluid; See Manual 307803 for other nozzles	1
15	223977	STUD, resistor	1
17	238039	REGULATOR, fluid; See separate parts list on page 46	1
18*	102982	O-RING; Teflon	1
19	186766	ARM, actuator	1
20†	185113	GASKET, manifold; polyethylene	1
21	112689	SCREW, socket; 1/4 x 0.75"	1
23	236826	PISTON ASSY.; Includes items 23a–23g	1
23a†	111508	• O-RING;	1
23b†	111504	• O-RING; fluoroelastomer	1
23c†	112319	• O-RING; fluoroelastomer	1
23d	189355	• STEM, piston	2
23e	189747	• PISTON	1
23f†	189752	• PACKING, u-cup; ultra high molecular weight polyethylene	1
23g	189754	• ROD, piston	1
24	185096	SCREW, cap, relieved; M5 x 0.8	3
25	222319	ALTERNATOR, turbine Includes items 25a and 25b	1
25a†	110073	• O-RING, Viton®	1
25b	185124	• CUSHION	1
26	223940	BARREL, gun	1
27	237250	POWER SUPPLY ASSY.; 60 kV Includes items 27a–27f	1
27a	186840	• GASKET	1
27b	185099	• PAD	1
27c	185145	• PAD	2
27f	192361	• PAD	1
28	224747	PACKING ROD ASSY. Includes items 28a–28h	1
28a	185495	• HOUSING, packing	1
28b	223981	• ROD, fluid	1
28c	185488	• NUT, packing	1
28d*	186069	• SPACER, packing	1
28e	178763	• PACKING, rod	1
28f*	178409	• PACKING, fluid	1
28g*	111504	• O-RING, fluoroelastomer	1
28h*	111316	• O-RING, fluoroelastomer	1
29	238097	BODY, gun	1
30	185114	RETAINER RING, alternator	1
31	112638	FITTING, fiber optic *(shown on page 54)*	1
36	102025	NUT, hex; 1/4"–20	1
46	101324	NUT, hex jam; 1/4"–20	1
75	237553	MANIFOLD ASSY.; See separate parts list on page 55	1
77☞	107460	WRENCH, ball end	1
78☞▲	186118	SIGN, warning, spray area, English	1
80☞	217115	GREASE, dielectric, tube	1
83☞	191744	MULTI-TOOL	1
84☞▲	179791	TAG, warning	1
85☞	189888	COVER, gun	1
86☞▲	290171	SIGN, warning English	1
87▲	290069	LABEL, warning	1
88	190899	ADAPTER	1
89	111328	FITTING, tube	1
90	054730	TUBING, air; 5/32 O.D.	†

* *These parts are included in Fluid Seal Repair Kit 237765, which may be purchased separately. This kit also includes the fluid hose o-rings; refer to page 56.*

† *These parts are included in Air Seal Repair Kit 236827, which may be purchased separately.*

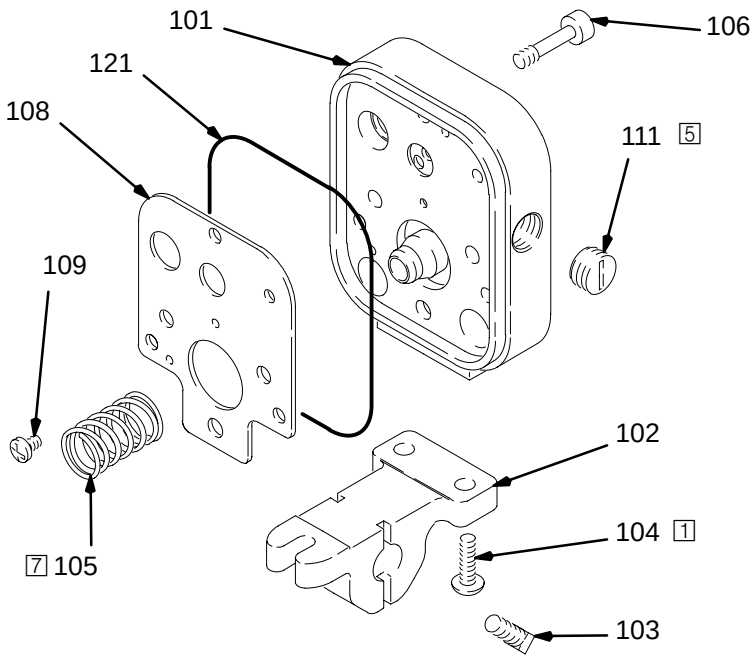
** *Order the warning label 290069 (item 87), at no cost, when ordering the shroud. Affix the label to the shroud.*

☞ *These parts are not shown in the parts drawing.*

† *Order the length of tubing needed.*

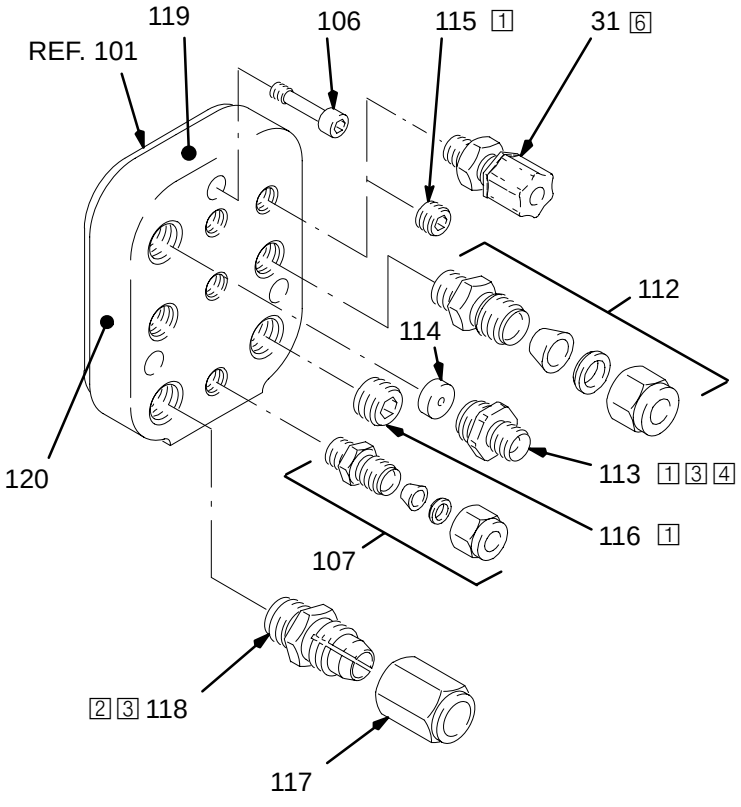
▲ *Replacement Warning labels, tags, and signs are available at no cost.*

Manifold Parts



Front View

04323



Back View

04322

1 Apply low strength *(purple)* Loctite® or an equivalent sealant to the threads.

2 Apply high strength *(green)* Loctite® or an equivalent sealant to the threads.

3 Tighten the fitting until the hex bottoms against the manifold.

4 This fitting (113) has left-hand threads.

5 Install the kV cap (111) flush to the outside surface.

6 An optional fiber optic fitting (31) is included with the gun assembly; see page 51. Remove the plug (115) and install the fitting (31) if a kV display is being used.

7 Press fit the spring (105).

Manifold Parts

⚠ WARNING

EQUIPMENT MISUSE HAZARD
Use only genuine Graco replacement parts. Using non-Graco parts could alter the gun's grounding continuity or cause parts to rupture or fail, which could result in a serious injury and property damage.

Part No. 237553 Gun Manifold

Includes items 101–121.

Ref. No.	Part No.	Description	Qty.
101	192095	MANIFOLD	1
102	189581	MOUNTING BRACKET	1
103	110465	BOLT, square head	2
104	112689	SCREW; 1/4–20 x 0.75”	2
105	112640	SPRING, compression	1
106	186846	BOLT, manifold; M5 x 0.8	3
107	111157	FITTING, tube; for 1/4” O.D. tube	2
108†	189363	GASKET, manifold	1
109	108290	SCREW; 8–32 x 1/4”	2
111	189365	kV CAP	1
112	110078	FITTING, tube; for 3/8” O.D. tube	1
113	186845	FITTING, turbine; 1/4”–18 npsm left-hand thread	1
114	107107	REGULATOR, disk	1
115	112645	PLUG; 1/8”–27 npt	2
116	112646	PLUG; 5/8–18 x 5/8”	1
117	190220	NUT, strain relief	1
118	190219	FITTING, strain relief	1
119	290068	LABEL, caution	1
120▲	290069	LABEL, warning	1
121†‡	190301	GASKET, foam	1

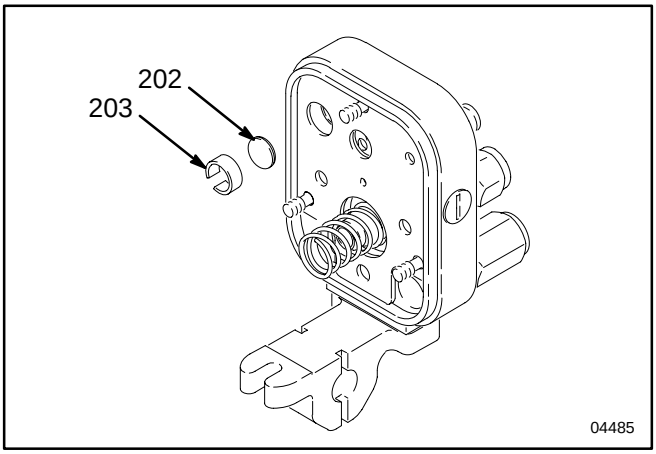
† *These parts are included in Air Seal Repair Kit 236827, which may be purchased separately.*

‡ *Optional gaskets are available:*
Part No. 111180: Viton®
Part No. 111333: Ethylene Propylene

▲ *Replacement Warning labels are available at no cost.*

Part No. 236852 Optional Fiber Optic Kit
The kit is not included with the gun. The kit is only for use with the ES Display Part No. 224117 to improve light transmission when two bulkhead splices are used. The kit includes items 201203.

Ref. No.	Part No.	Description	Qty.
201	112638	FITTING, fiber optic; see item 31 on page 54	1
202	111224	LENS	1
203	189875	SLEEVE	1



Accessories

Use Only Genuine Graco Parts and Accessories

Waterborne Fluid Hoses

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure

For connection between the voltage isolation system and the spray gun; 0.25 in. (6.35 mm) I.D.; Teflon®

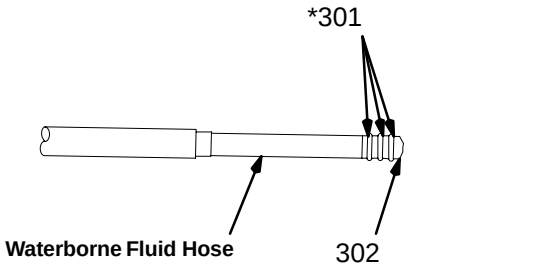
Shielded Hoses for use with the Graco H²O PRO Voltage Block:

Fluid Hose Assy. Part No.	Hose Length
237920	25 ft. (7.6 m)
237921	36 ft. (11 m)
237922	50 ft. (15.2 m)

Fluid Hose Replacement Parts

For fluid hoses 237920/921/922

Ref. No.	Part No.	Description	Qty.
301*	111450	O-RING	3
302	190143	BARBED FITTING	1



05342

* *The three o-rings are included in Fluid Seal Repair Kit 237765.*

Unshielded Hoses for use with the Graco H²O PRO Voltage Block:

Bare Teflon fluid hoses, without the ground shield. See Manual 308688 for information on the hoses.

Fluid Hose Assy. Part No.	Hose Length
238877	25 ft. (7.6 m)
238878	50 ft. (15.2 m)

Hoses for use with Graco Fenced Isolation System:

Fluid Hose Assy. Part No.	Hose Length
237548	25 ft. (7.6 m)
237549	36 ft. (11 m)
237550	50 ft. (15.2 m)

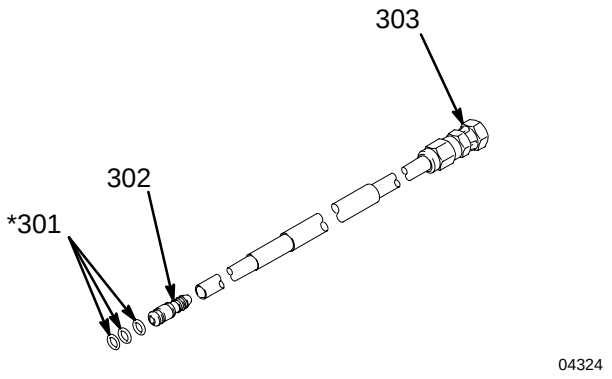
Hoses for use with non-Graco voltage isolation systems:**

Fluid Hose Assy. Part No.	Hose Length
237545	25 ft. (7.6 m)
237546	50 ft. (15.2 m)

Fluid Hose Replacement Parts

For fluid hoses 237545/546

Ref. No.	Part No.	Description	Qty.
301*	111450	O-RING	3
302	190143	BARBED FITTING	1
303	112480	SWIVEL FITTING	1



04324

* *The three o-rings are included in Fluid Seal Repair Kit 237765.*

** *The Graco warranty is void if the spray gun is connected to a non-Graco voltage isolation system.*

Accessories

Use Only Genuine Graco Parts and Accessories

Electrically Conductive Air Hoses

100 psi (0.7 MPa, 7 bar) Maximum Working Pressure

For connection between the air supply and the spray gun; conductive, stainless steel, wire braid for grounding; polyurethane tube and cover; 0.315 in. I.D.; 1/4 npsm(f) x 1/4 npsm(f) left-hand thread; the hose is color-coded red

Hose Part No.	Hose Length
235068	6 ft. (1.8 m)
235069	15 ft. (4.6 m)
235070	25 ft. (7.6 m)
235071	36 ft. (11.0 m)
235072	50 ft. (15.2 m)
235073	75 ft. (23.0 m)
235074	100 ft. (30. 5 m)

Fluid Regulator Conversion Kit 238147

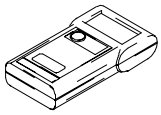
To add a fluid regulator to the part no. 237603 and 236824 PRO 5500wb spray guns. See page 47 for kit installation instructions.

Gun High Voltage Probe & Meter 217452

For direct measurement of the gun output voltage.

Megohmmeter 241079

500 Volt output; 0.01–2000 megohms.
Not for use in Hazardous areas.



TI0377

Grounding Rod 210084

For use in the **Fluid Voltage Discharge and Grounding Procedure**.

Technical Data

Category	Data
Maximum Working Pressure	100 psi (0.7 MPa, 7 bar)
Air Pressure Operating Range	0–100 psi (0–0.7 MPa, 0–7 bar)
Fluid Pressure Operating Range	0–100 psi (0–0.7 MPa, 0–7 bar)
Voltage Output	0–60 kV*
Short Circuit Current Output	120 mA
Turbine Air Inlet	1/4 npsm(m), left-hand
Fluid Inlet	custom inlet for Graco waterborne fluid hose
Weight (gun and manifold)	
Part No. 237603 Part No. 238091	3.6 lb (1620 g) 4.0 lb (1818 g)
Fluid Specification	For use with fluids that meet at least one of the following conditions for non-flammability: ● The fluid has a flash point above 140°F (60°C) and a maximum organic solvent concentration of 20%, by weight, per ASTM Standard D93. ● The fluid does not sustain burning when tested per ASTM Standard D4206 Sustained Burn Test.

Category	Data
Maximum Fluid Temperature	120°F (49°C)
Wetted Parts	Stainless Steel, Nylon, Acetal, Teflon®, Kalrez®, Ceramic, Chemraz®, Fluoro-polymer
Maximum Noise Level with atomization air at 100 psi (0.7 MPa, 7 bar) and maximum air flow	
Sound Pressure † Sound Power ‡	101.5 Db(A) 107.0 Db(A)

† Sound pressure was measured per Cagi Pneurop, 1969. The measurement was taken 3.28 feet (1 meter) from the air cap.

‡ Sound power was measured per ISO–3744, 1981.

* Do not exceed 60 kV. Operating the gun above 60 kV will void the Graco warranty. The gun's normal high voltage reading is 45 to 55 kV due to spraying current demands and isolation system losses.

Teflon®, Viton®, and Kalrez® are registered trademarks of the DuPont Co.

Loctite® is a registered trademark of the Loctite Corporation.

Chemraz® is a registered trademark of the Green, Tweed, & Company.

Manual Change Summary

This manual has been changed per ECO's V5645, V481, and V389203.

Notes

Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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1–800–367–4023 Toll Free

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